James Hutton's Metaphysics, Theory of Language, and Science, in the Scottish Enlightenment

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Declaration

I hereby certify that this PhD thesis has been written by me and represents my own work, and that the work herein has not been submitted for any other degree or qualification.

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Abstract

James Hutton (1726-1797) is most famous for his *Theory of the Earth* in which he demonstrated the vast time scale of the geological process and has become known as "the founder of modern geology." Much therefore has been written about Hutton's work on geology, but he was in fact a polymath who published on a variety of subjects in natural philosophy and philosophy which have been largely neglected. Indeed, his longest publication the three-volume metaphysical work *An Investigation of the Principles of Knowledge and of the Progress of Reason, from Sense to Science and Philosophy* (1794) has been virtually ignored. Yet without an examination of his metaphysical inquiry it is difficult to comprehend his approach to science. Embedded within his metaphysics was Hutton's theory of language which is the main subject of this thesis.

Beginning with an introduction which biographically and historiographically contextualizes Hutton, this thesis is then divided into three parts: Metaphysics, Language, and Science. The first part contains an analysis of Hutton's metaphysics and an explanation of why it has been neglected. It also considers the influence of Hutton's university professors—specifically Colin MacLaurin and John Stevenson—on his metaphysics and theory of language. Additionally this part includes an examination of what has been written about Hutton's metaphysics most notably in the contemporary periodicals *The Analytical Review*, *The Critical Review*, and *The English Review*. The second part begins by illustrating the importance that Hutton attached to his work on language as he presented it to an intellectually elite audience as part of a linguistic debate at the Royal Society of Edinburgh. Using manuscript evidence from the Society's records this part also illustrates the extent of Hutton's

activities in both the Physical Class and the Literary Class of the Royal Society of Edinburgh. Additionally this part shows that Hutton's published theory of language, which contained dissertations on speech and orthography, was a social, cultural and pedagogical response to the period's preoccupation with standardization. But Hutton's theory differed completely from the preoccupation with an elitist standard that was prevalent at the time, as he thought that the fashionable pronunciation of the Court and the polite metropolitan society of London were just as erroneous as any regional dialect since they all failed to adhere to proper principles. In the third part it is argued that Hutton's principles of orthography had implications for his and other's science since if natural philosophy continued to be written on an erroneous etymological standard it would eventually fall into scientific ruin. The thesis concludes that since Hutton's theory of language was ultimately part of his metaphysics which he applied to his science, then in order to fully comprehend Hutton's science his metaphysics and theory of language should be taken into consideration.

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Introduction

James Hutton was born in Edinburgh on 3 June 1726. He was the son of William Hutton, a merchant who had held the office of City Treasurer, and Sarah Balfour, the daughter of John Balfour another Edinburgh merchant. Hutton had three sisters, Sarah, Jean and Isabella, as well as an older brother John who died as a child. Hutton's father died in 1729 when James was only three-years-old but he left the family financially sound. As a boy, Hutton was educated by his mother at home until he attended the High School of Edinburgh at age eleven. Then in November 1740, fourteen-year-old Hutton began his studies as a student of humanity at the University of Edinburgh. Three years later in 1743, when he was seventeen, Hutton entered a brief and unsuccessful legal apprenticeship and by the following year he had returned to the University of Edinburgh. There he studied medicine, but on turning twenty-one Hutton abruptly moved to Paris in 1747, a move that could have been associated with the birth of an illegitimate son which happened about this time. In Paris Hutton studied chemistry and anatomy, then after two years in France he returned to Britain via Holland where he was awarded his Doctor of Medicine degree at Leyden in September 1749 for a thesis entitled *De Sanguine et Circulatione Microcosmi (On human blood and its circulation).*[1] Hutton then spent several months in London from late 1749 until the summer of 1750 when he returned to Scotland. On his return to Scotland Hutton became successful in business along with John Davie, a former student friend, by devising a synthesized process to manufacture sal ammoniac (ammonium chloride). Used as a metallurgy flux and as smelling salts, sal ammoniac had previously to be imported and this new process made Hutton

[1] Donovan, Arthur and Joseph Prentiss. 'James Hutton's Medical Dissertation' in *Transactions of the American Philosophical Society held at Philadelphia for Promoting Useful Knowledge.* Vol. 70., Part 6. Philadelphia, PA: The American Philosophical Society, September 24, 1980. 3-57.

financially independent. An interest in agriculture then took Hutton to Norfolk in 1752 to learn the latest methods of farming. It was also at this time that his interest in geology began and while he made excursions throughout England "on foot" to further his knowledge on agriculture, "it was in the course of them that to amuse himself on the road, he first began to study mineralogy or geology."[2] Hutton also made a tour from the early spring until the middle of summer of 1754 "from Rotterdam through Holland, Brabant, Flanders, and Picardy."[3] By the end of the summer of 1754 he had returned to Scotland and began to put his agricultural improvement plans into action on farms which he had inherited at Slighhouses and Nether Monynut in Berwickshire. Indeed, Hutton's farming achievements became legendary as Adam Ferguson noted that "he hastened to Norfolk" where

> he purchased a plough, hired a ploughman, and brought both on post-chaise with him to Berwickshire. The neighbours were diverted with this assortment of company and baggage, and no less with the attempt which followed, to plough with a pair of horses without a driver. This joke, however, has become serious, and is now the general practice from one end of Scotland to the other.[4]

Although he made several geological excursions throughout England and Scotland, and made several visits to Edinburgh, Hutton mostly remained on his farm from 1754 engaged in improving agricultural practices until 1767 when he returned to live in his native Edinburgh. While Hutton's farms and sal ammoniac business continued to boost his income, his other business interests included an active role on the committee of one of the greatest engineering projects of the time: the Forth and

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[2] Playfair, John. 'Biographical Account of the late Dr James Hutton, F.R.S.Edin.' from Volume V of *Transactions of the Royal Society of Edinburgh*, (Edinburgh: Royal Society of Edinburgh, 1805) 39-99. 44.

[3] Ibid.

[4] Ferguson, Adam. 'Minutes of the Life and Character of Joseph Black M.D.' from Volume V of *Transactions of the Royal Society of Edinburgh*, (Edinburgh: Royal Society of Edinburgh, 1805) 101-117. 114-115.

Clyde Canal.[5] So being independently wealthy held the advantage of not having to spend time in employment that would have diverted him from his studies, as well as not being beholden to patronage that could have influenced his findings. Therefore, once he had moved back to Edinburgh in 1767, as his first biographer John Playfair wrote, Hutton was able to give "his undivided attention from that time to scientific pursuits."[6]

On his return to Edinburgh Hutton became a member of the Philosophical Society in 1768 and "he read several papers" to that society during the period from 1771 until 1783.[7] The Philosophical Society then turned into the Royal Society of Edinburgh in 1783 and Hutton became a founding member of the Royal Society of Edinburgh. This was a relatively formal gathering as records of the meetings were kept and papers were published in the *Transactions of the Royal Society of Edinburgh*; and it was in this environment that Hutton tested his work in front of an intellectually exclusive audience before publishing the full-length versions through the prestigious publishing houses of Andrew Strahan and Thomas Cadell of London, Thomas Cadell Junior and William Davies of London, and William Creech of Edinburgh. Indeed, prior to the release of the first volume of the *Transactions of the Royal Society of Edinburgh* in 1788 Hutton had only published a pamphlet on coal taxation in 1777[8], and although he had amassed an enormous amount of manuscript by the mid-1780s John Playfair believed that it was in fact only Hutton's enthusiastic

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[5] 'A list of the committee, &c. for managing the affairs of the company of the Forth and Clyde navigation, appointed by the first general meeting, held, at London, March 14, 1768.' *Scots Magazine*, 30, June 1768. 36.

[6] Playfair, 'Biographical Account', 46.

[7] Ibid., 50.

[8] Hutton, James. *Considerations on the nature, quality, and distinctions, of coal and culm, with inquiries, philosophical and political, into the present state of laws, and the questions now in agitation relative to the taxes upon these commodities. Contained in a letter from Doctor James Hutton, physician in Edinburgh: to a friend.* Printed for, and sold by C. Elliot, Parliament-Square, and Richardson and Urquhart, London, 1777.

support for the Royal Society of Edinburgh which prompted him in 1785 to read the *Theory of the Earth* at the Physical Class as he

> was in no haste to publish his theory [of the earth]; for he was one of those who are much more delighted with the contemplation of truth, than with the praise of having discovered it. It might therefore have been a long time before he had given any thing on this subject to the public, had not his zeal for supporting a recent institution which he thought of importance to the progress of science in his own country induced him to come forward, and to communicate to the Royal Society [of Edinburgh] a concise account of his theory of the earth.[9]

And although Hutton had circulated his theory as an *Abstract concerning the System of the Earth, its Duration, and Stability* around his circle of friends in 1785, it was the publication of this *Theory of the Earth* in the first volume of *Transactions of the Royal Society of Edinburgh* in 1788 that subsequently led to criticism which prompted Hutton to publish his theory in full in 1795.

Hutton's *Theory of the Earth* was epoch-making as he rejected the Biblical chronology that the earth was six-thousand years old and the relative catastrophic position that fossils found on mountain tops were the result of Noah's flood. Instead, Hutton advanced that the earth experiences a cycle of erosion, deposition, consolidation and uplift. Immense underground heat produces consolidation and uplift and the entire system occurs continually over a period beyond the capabilities of human observation or as described in Hutton's most famous dictum we can "find no vestige of a beginning,—no prospect of an end."[10] However, aware of the extremely controversial implications of his theory Hutton attempted to avoid being in conflict with Mosaic chronology as he wrote an (unpublished) preface intended to preempt criticism. Entitled *Memorial justifying the present Theory of the Earth from*

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[9] Playfair, 'Biographical Account', 51.
[10] Hutton, James. *Theory of the Earth, with Proofs and Illustrations*. Volume I. Edinburgh: Printed for Messers Cadell, Junior, and Davies, London; and William Creech, Edinburgh. 1795. 200.

the suspicion of impiety he sent it to William Robertson who rewrote it but Hutton decided against using it as indeed Robertson had suggested.[11] Nevertheless, once the *Theory of the Earth* had been published in the *Transactions of the Royal Society of Edinburgh* it was immediately met with criticism by John Williams in a 'Refutation of Dr Hutton's Theory of the Earth' as part of the Preface of his *Natural History of the Mineral Kingdom* (1789) since,

> The wild and unnatural notion of the eternity of the world leads first to scepticism, and at last to downright infidelity and atheism. If once we entertain a firm persuasion that the world is eternal, and can go on of itself in the reproduction and progressive vicissitude of things, we may then suppose that there is no use for the interposition of a governing power; and because we do not see the Supreme Being with our bodily eyes, we depose the almighty Creator and Governor of the universe from his office, and instead of divine providence, we commit the care of all things to blind chance. Like a mob, who think they can do well enough without legal restraints, depose and slay their Magistrates. But this is rebellion against lawful authority, which must soon end in anarchy, confusion, and misery, and so does our intellectual rebellion. How degrading is infidelity! how miserable must a thinking man be in distress, who does not believe that there is at the head of the creation, a good, intelligent, and powerful being, who cares for his welfare through all the stages of existence![12]

This accusation that likened Hutton's theory to mob-rule was written by Williams in September 1789 and his rhetoric suggests that he may have analogised the theory with events in France as the storming of the Bastille had occurred just a few weeks previously on 14 July. After Williams' attack a series of letters published in the *Monthly Review* in 1790 and 1791 by Jean André Deluc (who had earlier disagreed with Hutton's work on meteorology) also attacked Hutton's *Theory of the Earth.* However, it was the 1793 attack by Richard Kirwan in the *Transaction of the Royal*

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[11] Dean, Dennis R., 'James Hutton on Religion and Geology: the unpublished preface to his Theory of the Earth (1788)' in *Annals of Science.* Volume 32, Number 3 (1975) 187-193.

[12] Williams, John. 'Refutation of Dr Hutton's Theory of the Earth' in the Preface of *Natural History of the Mineral Kingdom.* (2 volumes) Edinburgh: Thomas Ruddiman, 1789. Volume I, Preface, 23-62. 59-60.

Irish Academy which prompted Hutton to publish his theory in full.[13] Indeed, Playfair noted that,

> Before this period, though Dr Hutton had been often urged by his friends to publish his entire work on the *Theory of the Earth*, he had continually put off the publication, and there seemed to be some danger that it would not take place in his own life time. The very day, however, after Mr Kirwan's paper was put into his hands, he began the revisal of his manuscript, and resolved immediately to send it to the press. The reason he gave was, that Mr Kirwan had in so many instances completely mistaken, both the facts, and the reasonings in his *Theory*, that he saw the necessity of laying before the world a more ample explanation of them. The work was accordingly published, in two volumes octavo, in 1795; and contained, besides what was formerly given in the *Edinburgh Transactions*, the proofs and readings much more in detail, and a much fuller application of the principles to the explanation of appearances. The two volumes, however, then published, do not complete the theory: a third, necessary for that purpose, remained behind, and is still in manuscript.[14]

Certainly, Volume III of his *Theory of the Earth, with Proofs and Illustrations* remained in manuscript until a surviving fragment of it was published in 1899.

During the three years prior to the publication of *Theory of the Earth, with Proofs and Illustrations* Volumes I & II in 1795, Hutton's other most voluminous publications had appeared as *Dissertations on Different Subjects in Natural Philosophy* (1792), *An Investigation of the Principles of Knowledge, and of the Progress of Reason, from Sense to Science and Philosophy* [hereafter *Principles of Knowledge*] (1794), and *A Dissertation upon the Philosophy of Light, Heat, and Fire* (1794). But in the course of publishing his most voluminous works his health was deteriorating as he had contracted a suppression of urine and was subjected to a very painful and dangerous operation by his friend Joseph Black. At times his health

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[13] Kirwan, Richard. 'Examination of the Supposed Igneous Origin of Stony Substances' in *Transactions of the Royal Irish Academy*. 1793. Volume 5. 51-87.
[14] Playfair, 'Biographical Account', 86.

improved and he was "remarkably well"[15] and "in excellent spirits,"[16] and able to resume working, however for his remaining years Hutton was confined to the house that he had built at 3 St. John's Hill in Edinburgh. Indeed by April 1795 in a letter to James Watt, Joseph Black wrote that, "Dr. Hutton has been close confined to the house for this twelve months and is now without hope of relief from his confinement but he enjoys good Spirits and is constantly employed in writing and publishing."[17] Black noted in the summer of 1796 that "when free from pain" Hutton was "still in possession of his usual vivacity and activity in thinking and conversation and writing," although "there are days now and then when he is distressed with painfull (sic) spasms of the bladder, occasioned by a Stone, and his sensibility is so acute that pain is to him uncommonly distressing."[18] But by the winter of 1796-7, Playfair noted that Hutton "became gradually weaker, was extremely emaciated, and suffered much pain" even although he "still retained the full activity and acuteness of mind."[19] Hutton died on 26 March 1797 and was buried in Greyfriars Kirkyard. Although he had "lived with his sisters, three excellent women, who managed his domestic affairs", it was only Isabella who "remained to lament his death."[20] Nevertheless, Playfair informs us that on the day of his death and in spite of a great deal of pain, Hutton was still employing "himself in writing, and particularly in noting down his remarks on some attempts which were then making towards a new

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[15] Black, Joseph. Letter from Joseph Black to James Watt (Birmingham)—Edinburgh 10th May 1794. As published in *Partners in Science—Letters of James Watt and Joseph Black* edited by Eric Robinson and Douglas McKie. London: Constable & Co. Ltd., 1970. 200.
[16] Ibid., 16th January 1794. 198.
[17] Ibid., 12th April 1795. 215.
[18] Ibid., 28th July 1796. 226.
[19] Playfair, 'Biographical Account', 87.
[20] Ibid., 99.

mineralogical nomenclature."[21] A fortnight later John Robison wrote a letter to James Watt in Birmingham and noted that Joseph Black

> feels very strongly the loss of his amiable and worthy Friend and Companion Dr. Hutton. Dr. Black has not had Spirits enough to be able to see Dr. Hutton these several Months, till within a few days of his decease—He left us without a struggle, in less than half a minute—after speaking with the utmost clearness—He was busy with another large volume and had engaged the Engraver to come and get his orders the day after that in which he died.[22]

Evidently, the 'Engraver' did not come as the rest of Hutton's work remained in manuscript until a fragment of Volume III of his *Theory of the Earth* was published in 1899 and *The Lost Drawings* were published in 1978. His *Elements of Agriculture* has never been published. While Hutton's time had ran out his geology was to bring about a 'paradigm shift'[23] in thinking, that was to reverberate throughout the modern sciences as the cyclical formation of landforms postulated in Huttonian Uniformitarianism astonishingly changed the comprehension of the age of the Earth. Hutton had therefore done for the Earth Sciences of

> geology and geomorphology what Newton had already achieved for astronomy, and what Darwin was destined to do for biology. Indeed, Darwin, through Lyell, owed a debt to Hutton, because Darwin's theory of evolution by means of natural selection is merely an application to the organic world of that slow evolutionary process which Hutton had first perceived in Nature.[24]

Whereas Hutton was involved in the formal environments of the Philosophical Society and the Royal Society of Edinburgh during the last thirty years of his life; he was also a founding member and active participant of the informal

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[21] Ibid., 88.
[22] Robison, John. Letter from John Robison to James Watt (Birmingham)—Edinburgh 7th April 1797. As published in *Partners in Science—Letters of James Watt and Joseph Black* edited by Eric Robinson and Douglas McKie. London: Constable & Co. Ltd., 1970. 269.
[23] Kuhn, Thomas S. *The Structure of Scientific Revolutions*. Chicago: University of Chicago Press, 1962. (3rd ed., 1996). Passim.
[24] Davies, Gordon L., *The Earth in Decay: A History of British Geomorphology, 1578-1878*. London: MacDonald & Co., 1969. 185.

Oyster Club along with his friends Adam Smith and Joseph Black. Playfair's impression of Smith, Black and Hutton was that,

> As all three possessed great talents, enlarged views, and extensive information, without any of the stateliness and formality which men of letters think it sometimes necessary to affect; as they were all three easily amused; were equally prepared to speak and to listen; and as the sincerity of their friendship had never been darkened by the least shade of envy; it would be hard to find an example, where every thing favourable to good society was more perfectly united, and every thing adverse more entirely excluded.[25]

This lack of formality at the Oyster Club however meant that we are left with little detail as to what went on at meetings. But it is known that other members of the Oyster Club included leading members of the Edinburgh literati such as the architect Robert Adam, Hugh Blair, John Clerk of Eldin, William Cullen, Adam Ferguson, Sir James Hall, John Hope, Henry MacKenzie, John Playfair, William Robertson, and Dugald Stewart. It was an informal intellectual environment which was thought to be characteristic of the country as,

> In London, in Paris, and other large cities of Europe, though they contain many literary men, that access to them is difficult; and, even after that is obtained, the conversation is, for some time, shy and constrained. In Edinburgh, the access to men of parts is not only easy, but their conversation and the communication of their knowledge are at once imparted to intelligent strangers with the utmost liberality. The philosophers of Scotland have no nostrums. They tell what they know, and deliver their sentiments without disguise or reserve.[26]

And it was an informal environment that suited Hutton well and one in which he evidently flourished. Indeed, he was a most welcome guest at many of the private gatherings of such members of the literati as Monboddo, Smith, Ferguson and many

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[25] Playfair, 'Biographical Account', 98.

[26] Smellie, William. *Literary and Characteristical Lives of John Gregory, M.D.;, Henry Home, Lord Kames; David Hume Esq.; and Adam Smith, L.L.D. to which are added A Dissertation on Public Spirit and Three Essays.* Edinburgh: Alex. Smellie, 1800. 162.

others, and Playfair noted that a "brighter tint of gaiety and chearfulness (sic) spread itself over every countenance when" he "entered the room."[27] Certainly,

> He had, indeed, that genuine simplicity, originating in the absence of all selfishness and vanity, by which a man loses sight of himself altogether, and neither conceals what is, nor affects what is not…His great liveliness, added to this aptness to lose sight of himself, would sometimes lead him into little excentricities (sic), that formed an amusing contrast with the graver habits of a philosophic life….His conversation was extremely animated and forcible, and, whether serious or gay, full of ingenious and original observation. Great information, and an excellent memory, supplied an inexhaustible fund of illustration, always happily introduced, and in which, when the subject admitted of it, the witty and the ludicrous never failed to occupy a considerable place.—But it is impossible by words to convey any idea of the effect of his conversation, and of the impression made by so much philosophy, gaiety and humour, accompanied by a manner at once so animated and so simple. Things are made known only by comparison, and that which is *unique* admits of no description.[28]

Hutton's circle of illustrious friends included Joseph Black, James Russell, Sir George Clerk and James Lind, as well as several others.[29] But while Hutton thought that it was only the intelligentsia who could fully understand his work, he never lost his common touch. A description of Hutton as being "an aristocrat of the mind"[30] was clearly a misleading metaphor, as indeed Playfair wrote how during an agricultural excursion the peasants in Norfolk would not have kept a distance from him as "It was always true of Dr. Hutton, that to an ordinary man he appeared to be an ordinary man."[31]

It seems likely that language was often a subject of discussion at these informal gatherings since Adam Smith, Lord Monboddo, and many others had written on the subject. The subject had been so popular during the eighteenth

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[27] Playfair, 'Biographical Account', 98.
[28] Ibid., 94.
[29] Ibid., 46.
[30] Porter, Roy. *The Making of Geology: Earth Science in Britain, 1660-1815*. Cambridge: Cambridge University Press, 1977. 156.
[31] Playfair, 'Biographical Account', 43-44.

century and there were inquiries into the relationship between language and society as well as language and mind which encompassed thoughts on the order of the parts of speech as well as a vigorous debate into the origin of language that took a number of forms including conjectural natural histories of language. However, Hutton's method of explaining how language was formed was written as part of his illustration of the progress of mind from sense to science and then to philosophy in which he noted that,

> The philosophy of science surely cannot be complete, until the natural progress of the human mind, in forming language, be studied in its principles. For, language is truly a record, in which the operations of a mind, proceeding to communicate its thoughts, may be legible; therefore, in seeing the elements of language, we shall trace the original thoughts of men; and, it is by examining what has passed in the mind, that the nature of our knowledge be understood.[32]

And Hutton's theory of language as part of a larger work on metaphysics was comprised of his thoughts upon speech as well as his most original contribution to the eighteenth century discussion of language which was his thinking about orthography. Hutton presented the orthographic part of his work on language to the Royal Society of Edinburgh on June 19, July 17 and November 20, of 1786 in a paper entitled *Dissertation on Written Language as a Sign of Speech*. The full version was published as part of his *Principles of Knowledge* in 1794. The discussion of language occupied 246 of its 2,173 quarto pages and was in two parts: the first an examination of the principles of speech, the second a discussion of the principles of orthography.

The section on spoken language contributed to the debate on the relationship of language to mind and included a response to the *philosophes* Charles de Brosses

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[32] Hutton, James. *An Investigation of the Principles of Knowledge, and of the Progress of Reason, from Sense to Science and Philosophy*. 3 volumes. Edinburgh: printed for A. Strahan and T. Cadell, London, 1794. Volume I, 575. [hereafter PK I, 575.]

and Antoine Court de Gébelin who were attempting to revive the anachronistic belief that there was a natural connection between words and ideas. Indeed, Hutton attacked this theory of natural language since he held that language is unquestionably artificial. However, Hutton did believe that there are a fixed number of vocal sounds possible within human physiology and by identifying these 'elements' and having the orthography follow them then this would result in spoken language becoming more stable and written language more accurate.

The section on written language contributed to the debate on etymology and pronunciation and included a critique of contemporary etymological practises. Hutton, on the other hand constructed a universal alphabet by identifying the 'elements' of language, and it was by adhering to what in effect was a phonetic alphabet that Hutton thought science should progress. So by using rules instead of memory he pointed out how society and educational methods would benefit, but ultimately it was the accuracy and preservation of science that Hutton wished his audience to be concerned about. Indeed, Hutton clearly attached enormous importance to his work on language and this was evident in how he presented it to his audience: first by reading it at the Royal Society of Edinburgh, second by having part of it published in the *Transactions of the Royal Society of Edinburgh*, and third by having it published as part of his metaphysics by Andrew Strahan, and Thomas Cadell. Therefore, Hutton clearly thought that if his theory of language was to make an impression upon the Scots and English literati or those who had the power to enact an improvement, he had to present it in the most eminent way.

The ingenuity of Hutton's work on language was recognised by John Playfair as he noted that Hutton had "read several very ingenious papers on Written

Language, in the Royal Society of Edinburgh" before dedicating part of his metaphysics to his "Theory of Language."[33] But while Playfair read his 'Biographical account of the late Dr James Hutton, F.R.S.Edin.' at the Royal Society of Edinburgh on 10th January 1803 and subsequently published it in 1805 in Volume V of the *Transactions of the Royal Society of Edinburgh*[34] at least four contemporary periodicals had already reviewed Hutton's *Principles of Knowledge* and his theory of language. These reviews in *The Analytical Review*, *The Critical Review*, *The English Review*, and *The British Critic* on the whole praised Hutton's metaphysics as well as his work on language but were critical of his style of writing.

As Playfair himself wrote regarding Hutton's writing style, the "great size of the book [*Principles of Knowledge*], and the obscurity which may justly be objected to many parts of it, have probably prevented it from being received as it deserves, even among those who are conversant with abstract speculation."[35] This line of criticism continued into the late nineteenth-century. James McCosh wrote in his *The Scottish Philosophy* that James Hutton was an "author of an elaborate work in three large quarto volumes" on metaphysics, which "is full of awkwardly constructed sentences and of repetitions, and it is a weariness in the extreme to read it." McCosh went on to write that in *Principles of Knowledge* "we are made to feel at times that these thoughts must be profound, if only we could understand them. He certainly speculates on recondite subjects, but does not throw much light on them."[36] Indeed, the lack of clarity in Hutton's writing has been repeatedly commented on, as for example in 1947 when the Royal Society of Edinburgh held a commemoration of the

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[33] Playfair, 'Biographical Account', 92n.
[34] Ibid., 39-99.
[35] Ibid., 85.
[36] McCosh, James. *The Scottish Philosophy.* New York: Robert Carter & Brothers, 1875. 262.

150th anniversary of Hutton's death, Professor S. I. Tomkeieff wrote that "Hutton was notoriously obscure in his writings. It requires a great effort, even after repeated reading, to grasp the meaning of his ideas."[37] But the neglect of Hutton's metaphysics has led to frequent misinterpretation of Hutton's intent within his other works.

Considering the significance Hutton attached to the reciprocal arrangement of physics and metaphysics and the importance of his first principles towards both natural and moral philosophy; it is extraordinary that so many writers have failed to grasp that Hutton was engaged in the pursuit of a general system and they have been unable to notice how his metaphysics and his physics are intertwined. In his scholarly book, *James Hutton and the History of Geology*, Dennis Dean even went so far as to complain that Playfair in his Biographical Account had given a "surprising amount of space to Hutton's philosophizing on physics and metaphysics."[38] But of course Playfair had good reason to write extensively [in fact it only covered twelve pages[39]] on Hutton's physics and metaphysics, indeed he went so far as to note that in regards to Hutton's work on physics, the "ingenuity of Dr Hutton's reasonings (sic) cannot be questioned, nor, I think, the justness of many of his conclusions."[40] Certainly, it was through his investigation of the nature of the material world from which Hutton was first led into an inquiry of metaphysical principles and consequently a complete metaphysical system was established in his 1794 *Principles of Knowledge*, and it was upon his physical and metaphysical principles that Hutton

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[37] Tomkeieff, S.I. 'James Hutton and the Philosophy of Geology' in *James Hutton—1726-1797, Commemoration of the 150th Anniversary of his Death* in Part IV of Volume LXIII (1948-49) of the Proceedings, Section B (Biology) of the Royal Society of Edinburgh. Edinburgh: Oliver & Boyd, 1950. 387-400. 387.

[38] Dean, Dennis R., *James Hutton and the History of Geology*. Ithaca &London: Cornell University Press, 1992. 123.

[39] Playfair, 'Biographical Account', 74-85.

[40] Ibid., 76-77.

based his geological theories in his *Theory of the Earth*. While there is no doubt that *Principles of Knowledge* is difficult to read, it has also received much undue criticism since its publication in 1794. Extraordinarily, and what has been completely ignored is that Hutton wrote that his writing would be difficult to read and understand, indeed this point has never been acknowledged by his contemporaries or subsequently. This point will be explained in Chapter One. So although Hutton thought he had treated his investigation "diffusively"[41]; the criticism of Hutton's writing has not taken into consideration what Hutton himself wrote about his composition, in fact John Playfair and Dugald Stewart ignored this and others have followed.

The obscurity of Hutton's metaphysics has meant that Hutton has been misunderstood as his *Theory of the Earth* has been constantly treated in isolation from his other work without considering the impact that his metaphysics had on his geology. Sir Edward Battersby Bailey, a twentieth-century biographer of Hutton, openly admitted that he had not even bothered to read Hutton's metaphysics as he wrote that, "By the time I struggled through Hutton's *Dissertations* [*on Different Subjects in Natural Philosophy*] on Physics, 1792, I found myself so exhausted that I took his three volumes of *Investigations* [*Principles of Knowledge*] into metaphysics, 1794, on trust from Playfair."[42] But Playfair had condensed 2,173 quarto pages into less than 4 quarto pages, and since it is difficult to comprehend Hutton's approach to science without an examination of his metaphysics it is no wonder that there has been so much misunderstanding about James Hutton. In spite of the fact that Hutton's works can be read and understood as stand-alone writings, we have it on

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[41] PK III, 675.

[42] Bailey, Edward Battersby. *James Hutton—the Founder of Modern Geology*. London: Elsevier Publishing Co. Ltd., 1967. 63.

authority from Hutton that most of his published work, especially his physics and metaphysics, was related as part of a comprehensive general system. And his metaphysics which an understanding of is key to an understanding of Hutton's overall general system including his geology has most often been ignored. Certainly, even in what has been perhaps the most scholarly biography of Hutton, Dennis R. Dean's *James Hutton and the History of Geology* (1992), only one paragraph was spent on *Principles of Knowledge*, which was Hutton's largest work, and that was paraphrased from Playfair's account.[43] This treatment has been in spite of the fact that Hutton noted that this was the foundation to his entire system; that without his metaphysics his geology would have been like bricks without mortar.

James Hutton is known today as 'The Founder of Modern Geology' because his *Theory of the Earth* changed the notion that the earth was thousands of years old to the established thinking that it is billions of years old. Understandably much has been written about Hutton's thoughts on geology but as a polymath there is much more to his story including agriculture, chemistry, meteorology, physics and metaphysics. However, the study of this non-geological work has not received the attention it deserves in spite of the fact that it was published in greater volume than his geology. Hutton's metaphysics was part of a general system that unified knowledge and his theory of language was an important part of his metaphysics. Therefore, his theory of language also played an important part in his wider general system, and this should be considered when attempting to gain an understanding of Hutton. Until now the history of Hutton's theory of language has not been told but while this thesis shows how Hutton presented his work and the potential benefits that

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[43] Dean, *James Hutton and the History of Geology*. 60.

it could provide for society and education, it also attempts to show how ultimately Hutton's method intended to contribute to the advancement of science.

It seems likely that Hutton's interest in the relationship between language and science had its roots in the teaching of John Stevenson and Colin Maclaurin. Both were Hutton's professors at the University of Edinburgh and while it has been shown how Hutton's writing on Design resembled Maclaurin's[44], as well as how an illustration made in Stevenson's class led to a lifelong fascination with chemistry[45], this thesis looks at other ways in which these two professors influenced James Hutton. Indeed, in Chapter One it will be shown how geometric reasoning was prioritized in MacLaurin's class, and metaphysics and language in Stevenson's logic and rhetoric class.

Throughout his life Hutton was accustomed to working in an interdisciplinary intellectual environment and his activities in this regard are similar to those displayed by MacLaurin. Certainly, just as Maclaurin facilitated the enlargement of the Society for the Improvement of Medical Knowledge to include philosophy and literature that resulted in the formation of the Society for Improving Arts and Sciences and particularly Natural Knowledge, or better known as the Philosophical Society; Hutton was enthusiastic for the interdisciplinary approach of the Royal Society of Edinburgh which allowed members of different interests to mix with the organisation of both a Physical Class and a Literary Class. In addition to the papers that he read at the Royal Society of Edinburgh, it is evident from the earliest Minute

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[44] The resemblance between MacLaurin and Hutton's writing on Design was pointed out in several examples in Donald B. McIntyre's 'James Hutton's Edinburgh: The Historical and Political Background', *Earth Sciences History* 16 (1997), 100-157.; and it was also pointed out in Judith V. Grabiner's 'Maclaurin and Newton: The Newtonian Style and the Authority of Mathematics' in *Science and Medicine in the Scottish Enlightenment* edited by Charles W. J. Withers and Paul Wood. East Linton, Scotland: Tuckwell Press, 2002. 143-171.

[45] Playfair, 'Biographical Account', 40.

Books that Hutton was extensively active within both the Literary and the Physical Class and that he held responsibilities as an Office Bearer on some of the Committees of the Society. Furthermore, most accounts of the early years of the Royal Society of Edinburgh have noted that while the Physical Class had a number of debates in progress, the Literary Class was lacking in themes and the interdisciplinary nature of the Society soon diminished as a result. But this thesis offers an alternative view as by examining the Minute Books of the Royal Society of Edinburgh it will be shown in Chapter Two how in fact there was a vigorous debate about language taking place that Hutton entered by reading his *Dissertation on Written Language as a Sign of Speech*.

Secondary literature on Hutton began with the contemporary reviews referred to above and then the biography by his friend John Playfair. Playfair noted that Hutton "was indefatigable in study, and was in the habit of using his pen continually as an instrument of thought, he wrote a great deal, and has left behind him an incredible quantity of manuscript, though imperfect, and never intended for the press."[46] But most of Hutton's manuscripts are lost and only a few letters have survived, so Hutton's publications and Playfair's biography are the only other primary sources available. And while Playfair's biography has been the fundamental guide to Hutton's life and works, it is important to note that this sympathetic account is not always reliable. Indeed, as a result of too much reliance on Playfair's eulogy myths have developed about Hutton's character. A portrait by Sir Henry Raeburn is apparently a most lifelike visual image of Hutton, but it typified a false notion from Playfair's account that Hutton was a model of abstinence. This myth was further

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[46] Ibid., 93.

reinforced in Robert Louis Stevenson's comment on Raeburn's portrait as "Hutton the geologist, in quakerish raiment, and looking altogether trim and narrow, and as if he cared more about fossils than young ladies."[47] However, from a closer inspection of some of the content of the surviving letters that Hutton wrote it is evident that he was not always the chaste and sober bachelor that Playfair would have us believe.[48] Certainly, Hutton fathered a son and this abrupt move to Paris in 1747 when he was still a student was most probably to avoid a potential scandal in Edinburgh. In fact, since the mother and child had moved to London it was only after Hutton died that many of his friends became aware that he had a son. Therefore, while Playfair's biography is a fundamental source of information about Hutton his eulogy cannot be viewed as definitive.

Most subsequent secondary work about James Hutton has focused on his geology and that is no surprise considering he was the first to notice that interpreting the past history of the earth can only be done by examining the earth as it exists at present while acknowledging that the earth's origins are beyond human investigation. Indeed, his *Theory of the Earth* shifted the accepted wisdom on the age of the earth and subsequently all branches of science have built upon his position. Sir Archibald Geikie, who was one of the most eminent scientists in nineteenth-century Britain, more than anyone, advanced the notion that Hutton was the father of modern geology. Certainly, Geikie noted,

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[47] Stevenson, Robert Louis. 'Some Portraits by Raeburn' in *Virginibus Puerisque and Other Papers*. London: Chatto & Windus, 1907. 141-150. 148.

[48] Hutton, James. Letter from Bridgnorth (sic) to George Clerk-Maxwell (1715-1784) in Edinburgh, July 1774. As published in 'The correspondence between James Hutton (1726-1797) and James Watt (1736-1819) with two letters from Hutton to George Clerk-Maxwell (1715-1784): Part I' by Jean Jones, Hugh S. Torrens, and Eric Robinson in *Annals of Science*, Volume 51 (1994) 637-653. 642-643.

> Hutton started with the grand conception that the past history of our globe must be explained by what can be seen to be happening now, or to have happened only recently. The dominant idea in his philosophy is that the present is the key to the past. We have grown so familiar with this idea, it enters so intimately into all our conceptions in regard to geological questions, that we do not readily realize the genius of the man who first grasped it with unerring insight, and made it the chief corner-stone of modern geology.[49]

However, in *The Earth in Decay: A History of British Geomorphology, 1578-1878* (1969) Gordon L. Davies asserted that Geikie had mythologized Hutton as having used completely modern methodology. In this book Davies made a number of assertions regarding how Hutton's *Theory of the Earth* should be viewed in relation to what was published before and after. While Davies gave Hutton considerable praise, it was nevertheless his belief that Hutton "was not so much the precursor of the late nineteenth-century school of fluvial geomorphology" but rather he was "the scholar who blended the simple, uncritical fluvialism of the seventeenth century with the teleology of the eighteenth century."[50] As a result, Davies' assertions sparked a lively discussion among geologists and historians of science as to whether Hutton's geological theory preceded or succeeded the evidence that was required to back it up. However, although Davies wrote that Hutton's Deism was "the basic premise from which the entire Huttonian theory stems. Metaphysics led him to geology through a simple chain of reasoning"[51], as with most who have participated in this animated debate he had not bothered to read Hutton's non-geological work that included his metaphysics which was his longest work of all.

While some writers were aware of and had alluded to the significance of Hutton's metaphysics and the fact that as with his geology it was merely a part of an entire system;

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[49] Geikie, Archibald. *The Founders of Geology*. London: MacMillan & Co. Ltd., 1897. 167-168.
[50] Davies, *The Earth in Decay*, 196.
[51] Ibid., 159.

it was not until Winslow H. Galbraith's unpublished PhD Thesis *James Hutton: An Analytical and Historical Study* (1974) that an attempt was made to examine Hutton's work as a whole.[52] This was long overdue as almost everyone to write about Hutton since Playfair had focused on single elements of Hutton's general system and as a result had distorted the thinking about Hutton; but since this thesis was not published, there still has not been a work that has covered Hutton's entire system. Even if Galbraith's thesis had been published it was written from a theological and philosophical perspective with little historical content and its main focus was to show how Hutton had blended science and theology in his general system.[53] And as Davies had already done, Galbraith criticised Geikie and other modern writers who had portrayed Hutton as the "de-theologizer of geology"; indeed, Galbraith noted that "no one can with an open mind read Hutton's works without noticing the prominent role played by his theology. It is possible to ignore Hutton's theology in attempting to reconstruct his view in some area, but it is not possible to do justice to Hutton in such a procedure."[54] In fact, for Galbraith Hutton's theology was the "starting point and the goal of the entire conceptual system."[55]

In his book *The Making of Geology: Earth Science in Britain, 1660-1815* (1977) Roy Porter extended this position by arguing that Hutton was not geology's "first truly empirical fieldworker"[56] and affirmed that this impression of Hutton merely existed as the result of "Geikie's championing."[57] Indeed, Porter asserted that Hutton's geology was "deductive"[58], old-fashioned, and that some of "his most important observations were made to confirm, not to decide, contentious points,

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[52] Galbraith, Winslow H. *James Hutton: An Analytical and Historical Study*, PhD Thesis, University of Pittsburgh, 1974.
[53] Ibid., 265.
[54] Ibid., 241.
[55] Ibid., 52.
[56] Porter, *The Making of Geology*, 184.
[57] Ibid., 152.
[58] Ibid., 186; 187; 189.

indeed after he had actually written his *Theory*."[59] Therefore, Porter thought that Hutton should be linked "to previous generations than to his immediate successors."[60] This position was maintained by Stephen Jay Gould in his *Hen's Teeth and Horse's Toes* (1984) as he thought that Hutton's "observations no doubt inspired, and instructed him; but we can show, also without doubt, that fieldwork was not the source of his theory....Fieldwork, at best, provided confirmation for a theory developed elsewhere."[61] Additionally, Gould in his *Time's Arrow, Time's Cycle* (1987) wrote that "Hutton presents his theory as the *a priori* solution to a problem in final causation, not as an induction from field evidence."[62] The position taken by Gordon L. Davies, Roy Porter and Stephen Jay Gould on Hutton's method raised the ire of numerous geologists who held that Hutton had used purely inductive methodology. So by the 1970s two entirely contrasting views on Hutton had developed; the first that he was the first truly empirical geological fieldworker, and the second that his geology was part of a general system constructed merely to illustrate design in the universe.

However, two subsequent articles have quashed the argument that Hutton's geological theory preceded his evidence. In his article "What was James Hutton's methodology?" David J. Leveson meticulously demonstrated how "revisionist accusations of *a priorism* [regarding Hutton's method] fail"[63], and with respect to the disputed proofs regarding granite and unconformities, "Hutton's reputation as an

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[59] Porter, The Making of Geology, 187.
[60] Ibid., 196.
[61] Gould, Stephen Jay. *Hen's Teeth and Horse's Toes: Further Reflections in Natural History*. Harmondsworth, Middlesex, England: Pelican, 1984. 89.
[62] Gould, Stephen Jay. *Time's Arrow, Time's Cycle: Myth and Metaphor in the Discovery of Geological Time*. Cambridge, MA: Harvard University Press, 1987. 76.
[63] Leveson, David J. 'What was James Hutton's methodology?' in *Archives of Natural History*. Vol.23, Part 1. London: Society for the History of Natural History, The Natural History Museum, February 5, 1996. 61-77. 61.

inductivist remains firm"[64] Leveson concluded that "Most vitally, theory construction appears to rest on a firm, pre-established empirical base"[65], and "his procedure, judged by modern standards—standards defined by the actual practice of scientists today—must be deemed acceptable and empirical."[66] Strong evidence to reinforce this position has been established in Donald B. McIntyre's "The Royal Society of Edinburgh, James Hutton, the Clerks of Penicuik and the Igneous Origin of Granite" in which it is shown how Hutton's evidence preceded his theory.[67]

Another perspective for the source of Hutton's geology was advanced in 1978 by J. E. O'Rourke who argued that Hutton had gone a "step beyond" the empiricism of Locke, Berkeley, and Hume and reached "a viewpoint similar to that of the great Prussian philosopher Immanuel Kant"[68] by "assigning a greater role to the operation of the mind in creating knowledge."[69] And so according to O'Rourke, Hutton had "apparently felt that he could not expound a radically new philosophy in a geological treatise that was itself too novel. So he dressed the theory in a teleology that was already out of fashion."[70] O'Rourke thought that misunderstandings about whether Hutton's methodology was truly modern or not had materialized because geologists such as Sir Archibald Geikie had ignored Hutton's design argument, whereas historians of science such as Roy Porter had taken Hutton's design argument too seriously.[71]

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[64] Ibid., 71.
[65] Ibid.
[66] Ibid., 75.
[67] McIntyre, Donald B. 'The Royal Society of Edinburgh, James Hutton, the Clerks of Penicuik and the Igneous Origin of Granite' in *A Supplement to the Transactions of the Royal Society of Edinburgh: Earth Sciences*, Volume 97, Suppl. 1- Suppl. 15, 2008 (for 2006).
[68] O'Rourke, J.E. 'A Comparison of James Hutton's *Principles of Knowledge* and *Theory of the Earth*' in ISIS: Volume 69, 1978. 5-20. 9.
[69] Ibid., 11.
[70] Ibid., 19.
[71] Ibid.

While geologists and historians of science have disagreed about Hutton's aims and methodology, intellectual historians have tended to overlook or misunderstand Hutton. During the last fifty years scholars have taken a keen interest in the intellectual history of eighteenth-century Scotland, but missing from these studies has been a thorough examination of James Hutton who alongside David Hume and Adam Smith was a *literatus* of the first rank. Several interesting articles by Jean Jones examining various aspects of Hutton's interests including his involvement in the Forth and Clyde Canal, his agricultural career, his geological collection, and his correspondence, have been helpful additions to understanding Hutton. However, an understanding of Hutton in a wider sense is lacking and the neglect of his metaphysics is the main reason behind this misunderstanding of Hutton. Only two essays have concentrated on Hutton's metaphysics: the first by Peter Jones concluded that,

> The distinctive features of Hutton's philosophy, as he would have admitted, are the comprehensive nature of his whole system, and the rigour of his method....Hutton, who repeatedly described his position as 'idealist', saw himself as starting at the same point as Locke, but as remaining more rigorously faithful to Lockean tenets than anyone else had done; Berkeley, Hume, and to some extent Reid, had all contributed essential improvements, but none had followed their insights consistently or integrated them into a comprehensive system.[72]

And in the later of the two essays, as the introduction to the only facsimile edition of *Principles of Knowledge*, Jean and Peter Jones noted that Hutton thought of both his moral and natural philosophy as being part of "a complete philosophical system, rare in the English language, by one of the founders of modern science. That fact alone justifies the reprinting of *Investigations*: more than two centuries after his death, a

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[72] Jones, Peter. 'An Outline of the Philosophy of James Hutton (1726-97)' in *Philosophers of the Scottish Enlightenment* edited by Vincent Hope. 1984. 182-210. 206-207.

proper assessment of Hutton's achievements may now be attempted..."[73] However, in the twelve years since this reprinting Hutton has continued to be overlooked and given the significance of his *Theory of the Earth* in modern thought it is extraordinary how little research has been undertaken regarding his non-geological work especially his metaphysics.

Recent studies of the 'Scottish Enlightenment' continue to neglect Hutton. Some have seen Hutton as primarily a natural philosopher. Others, notably students of the Scottish attempts to construct a 'Science of Man' have tended to ignore Hutton altogether presumably because he paid more attention to the organisation of the mind than to the organisation of society. Indeed, as Anand C. Chitnis put it,

> Once Hutton is seen as a moral philosopher he can be related to other *literati* of the Scottish Enlightenment. The social philosophers were concerned with the natural order, but as manifested in society. Hutton was more of a mental philosopher, to use an old-fashioned term: while his fellow philosophers saw happiness in an understanding of the natural order in society, Hutton saw it in an understanding of order in the mind, the attainment of wisdom.[74]

Richard B. Sher, taking the approach of the cultural historian argues that socially and intellectually the literati should be seen in an institutional context, and as an active member of Edinburgh's intellectual club life Hutton falls into that category. Overall, studies concerning the 'Scottish Enlightenment' have tended to ignore Hutton other than to mention how his *Theory of the Earth* changed the way in which the age of the earth is viewed. But Hutton should be remembered as having been much more than 'The Founder of Modern Geology' as in fact he published more work about non-geological topics than geological including his longest work: *Principles of*

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[73] Jones, Jean, and Peter Jones. 'Introduction' to *An Investigation of the Principles of Knowledge, and of the Progress of Reason, from Sense to Science and Philosophy* by James Hutton. Bristol: Thoemmes Press, 1999. v-xi. xi.

[74] Chitnis, Anand C. *The Scottish Enlightenment; A Social History*. London: Croom Helm, 1976. 171.

Knowledge. However, Hutton's *Principles of Knowledge* has only received an occasional mention and when it has been mentioned it has most often been misunderstood.

This thesis focuses on Hutton's theory of language and it would be remiss if it did not consider how Hutton has been regarded by linguists and historians of linguistics. In Peter Jones' 'Outline' and his subsequent 'Introduction' with Jean Jones it was mentioned that in *Principles of Knowledge* Hutton was engaged in a "long discussion of language."[75] The only other published work to have made more than a reference to Hutton's work on language was in a recent book by Jane Hodson whose main interest is the relationship between English Language and English Literature. Hodson noted that whereas some eighteenth century theorists were emphasising that the purpose of language was to communicate ideas with as much clarity as possible, in his *Principles of Knowledge* Hutton had "taken this a step further, arguing that as language is a direct mirror of the operations of the human mind, so an examination of language will reveal the progress of human thought."[76] But while these writings briefly discussed what Hutton had written on speech; no attention at all has been paid to Hutton's most original contribution to language theory which was his theory of orthography that will be examined in Chapter Four.

The method that has been employed in this thesis is that of textual exegesis since without a straightforward reading of *Principles of Knowledge* it is impossible to comprehend Hutton's intentions or to contextualise them. Misunderstanding about Hutton's geology began with his early critics accusing him of atheism and this was followed by myth and counter-myth regarding his methodology. But the key to his

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[75] Jones, and Jones. 'Introduction', xi.
[76] Hodson, Jane. *Language and Revolution in Burke, Wollstonecraft, Paine, and Godwin*. Aldershot, Hampshire, England: Ashgate Publishing Ltd., 2007. 26.

theism and his method, indeed to comprehending Hutton, is through his metaphysical text. However, even his associates ignored some basic but fundamental points that Hutton made in his metaphysics regarding the subject, method, composition and systematic approach of his work. Subsequently, the confusion surrounding *Principles of Knowledge* has affected what has been written about Hutton in context as well as muddled what is thought about his geology. Employing the method of textual exegesis in this thesis does not imply that Hutton's texts are free of any underlying social, political, or cultural beliefs. It is just that before Hutton can be contextualised or even an in-depth comparative analysis of other texts is undertaken, it is vital to establish the straightforward content of this key text especially in relation to his other works and the historiography surrounding them. Nevertheless, the challenge in any exegesis is to avoid it turning into an eisegesis. So the aim of this thesis has been to take at face value what Hutton published on metaphysics and language. And it concludes that current interpretations of Hutton are inadequate in light of the findings of this thesis.

The historiography regarding Hutton has been mainly focused upon whether or not his *Theory of the Earth* displayed modern scientific methodology. However, this thesis argues that the answer to that question is not made clear by examining the *Theory of the Earth* in isolation—indeed, it can only be specifically answered by first examining Hutton's *Principles of Knowledge* since it was the epistemology revealed in this text which Hutton applied to his other work including his geology and which is the key to unlocking what was Hutton's methodology. The significance then of Hutton's metaphysics was that it contains his scientific method, the reason that he was a deist and took a systematic approach, as well as how he considered his self-

image to be as a philosopher rather than as a geologist. Hutton applied both *a priori* and *a posteriori* reasoning to his natural philosophy, but this thesis shows that his metaphysics reveals that *a posteriori* always took precedence over *a priori*. Although Hutton's systematic approach was based on strict empirical principles and his scientific method was clearly that observation must precede theory, a balance was required between the gathering of particulars and generalising since, for example in the case of his geology, correct metaphysical principles were necessary to comprehend a geological process too slow to be observed. So while disagreements have persisted as to whether Hutton used an inductive or a deductive approach to his *Theory of the Earth*, by examining his metaphysics it is shown in this thesis that he used both but that induction took precedence over deduction. Also, it is only by examining Hutton's metaphysics that it is possible to grasp that his deism was not only arrived at through *a posteriori* reasoning from first principles, but that, for Hutton, natural religion was equal to having the intellect of a philosopher. Lastly, another significant aspect of Hutton's metaphysics is that it is only by reading *Principles of Knowledge* that it is possible to comprehend why he thought of himself primarily as a philosopher rather than a geologist.

Hutton's theory of language played a significant role in his metaphysics as it was used to illustrate how the mind is ordered as well as to show the importance of utilising first principles. And while Hutton's theory of language was also a pedagogical, social and cultural critique against the false rules of etymology; his empirical remedy was made with the aim of generating a more literate and thus enlightened society. Additionally, Hutton's fourth branch of science was logic, and for Hutton logic is language. Therefore, this thesis argues that since language was

the creature of Hutton's science it was vitally important to express thoughts as accurately as possible in both speech and writing otherwise all of science was capable of falling into ruin.

Hutton's *Principles of Knowledge* was selected as the focus of this thesis due to its neglect. Indeed, his theory of language and in particular his theory of orthography was an unexplored but nevertheless original contribution to the eighteenth-century debate on language. But *Principles of Knowledge* was also the focus of this thesis because of its associations with Hutton's other work as well as the work of his contemporaries. The thesis is divided into three parts: metaphysics, language and science. Part One deals with Hutton's metaphysics and its neglect. Part Two considers Hutton's theory of language as given to the Royal Society of Edinburgh, and in its later complete format. And Part Three considers the importance of Hutton's theory of language to his and others' science.

Part I—Metaphysics

Chapter One—Hutton's Metaphysics

In order to comprehend Hutton's approach to science including his geology it is vital to examine his metaphysical inquiry. It was written at a time when science and religion were still considered compatible and while Hutton's natural religion is evident throughout his body of work including his geology, it is only evident in his metaphysics how he concluded that the universe was designed and that this conclusion could only be attained by philosophers. And an exploration of Hutton's theory of language must begin with some understanding of Hutton's metaphysics since it was within this inquiry that his theory of language was embedded. *An Investigation of the Principles of Knowledge and of the Progress of Reason, from Sense to Science and Philosophy* (1794) was divided into three parts: Part I—*Of the Natural Progress in Knowledge, or, The Instinctive Faculties which lead to Science*; Part II—*Of Science, or the Conscious Principles which lead to Wisdom*; and Part III—*Of Wisdom or Philosophy, as the Proper End of Science and Means of Happiness*. These three parts were in other words an examination of ideas, reason, and morals. But the progress of the mind to what Hutton thought was its purpose was long and complex and he acknowledged that it would be impossible to account for every complexity within the train of thought as

> the growth of mind does not, perhaps, proceed by any precise number of steps that we may be able to observe. There is a gradation, from a beginning, which may be definite, although perhaps we do not define it precisely, to an end, which seems to be indefinite, at least we cannot see its utmost extent; and, there are also certain stages that may be distinguished in this progress, although we may not be able accurately to fix the very beginning and termination of each.[77]

[77] PK II, 527.

Nevertheless, Hutton set out in enormous detail the progression of the mind which led from sense to science, which included his theory of language, and then on to philosophy.

Most importantly the acquisition of philosophy was the privilege of the few and Hutton thought that this state of mind was parallel to the realisation that there was order and design in the universe as he wrote that natural religion was "synonimous (sic) with philosophy."[78] While David Hume's *A Treatise of Human Nature* (1739, 1740), *Enquiry concerning Human Understanding* (1748) and *Dialogues Concerning Natural Religion* (1779) had undercut the deist position of the evidence of God's existence as seen in the order of nature, responses ranged from Lord Kames innate deity to Thomas Reid's common sense position. However, in contrast to Kames and Reid, Hutton believed that only those who had acquired progress in intellect to philosophy as well as having had a grasp of both physical and metaphysical principles were able to comprehend the wisdom and benevolence of God. And in many respects Hutton's metaphysics was an *a posteriori* exercise undertaken in the same vein as Hume's Science of Man, since it was clear that natural philosophy and natural religion could not be successfully investigated until proper metaphysical principles were established. It was in fact from this Humean approach to investigating human knowledge that Hutton argued that Hume's conclusion of scepticism was built upon false principles, and that his own conclusion of deism was built on proper principles.

Although Hutton did not believe that God could be known since it is impossible to attain equality with the omnipotent; he did believe that it could be inferred that a wise and benevolent God had created natural, intellectual and moral systems for the happiness of

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[78] PK III, 650.

humans. *Principles of Knowledge* is a constructive exercise in which Hutton focuses for the most part on his own philosophy. However, he realised that he would need to defend his position and in opposition to Hume Hutton thought that dogmatism was not only to be found in revealed religion but also in inordinate scepticism since,

> Superstition makes people believe, upon authority and without proper evidence, that which is not true. Scepticism, on the contrary, makes people deny or disbelieve, upon a mistaken notion with regard to evidence, that which is actually true. Philosophy makes people pursue a middle course, in taking nothing for granted or on authority, but in believing that for which there is found proper evidence.[79]

Instead Hutton believed that the proper way to obtain evidence was through the operation of doubting as "no degree of doubt or inquiry, which is the opposite of dogmatism, can be prejudicial to philosophy."[80] And in response to what he believed was Hume's excessive scepticism, Hutton argued not against Hume's conclusion but instead chose to attack what he thought were Hume's erroneous principles. Indeed, he reprimanded those who were unquestioning of Hume's first principles while being critical of Hume's conclusion as

> it does not appear that any body has detected a fallacy in Mr Hume's reasoning, although many have solicitously sought for such a thing. If it should be alledged (sic), by those who blame Mr Hume for having drawn wrong conclusions, that, as a philosopher, he should have examined his principles; this is true, but at the same time, it is not his conclusion that they should in that case blame; and, unless they have corrected his principles, they have no title to find fault, on this occasion, with principles which they admit.[81]

So a key part of Hutton's metaphysics was the correction of his predecessor's first principles especially John Locke's since Hume's scepticism was founded upon what Hutton thought were Locke's erroneous first principles.

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[79] PK II, 79-80.
[80] PK II, 79.
[81] PK I, 322.

Before examining Hutton's first principles and seeing how he positioned his philosophy in relation to Locke and Hume, it is important to see how he presented his *Principles of Knowledge*. The first section of Part I—*Of Knowledge in General, and the Object of this Treatise, being Introductory to the Work*—consisted of four chapters in which Hutton set down much of the groundwork for his investigation. It was essentially an introduction in which Hutton put forth his aims for the work as well as giving an explanation of his peculiar terminology. But this introductory section also contains the fundamental position of Hutton's scientific methodology which was the procedure of 'remounting to principles.' Therefore, it is necessary to begin this analysis of Hutton's metaphysics with a survey of these early chapters of *Principles of Knowledge*.

In Chapter I—*Nature of Human Knowledge, and Purpose of Reflection*—Hutton noted that the purpose of his investigation was to find the principles upon which we may judge science "without diffidence or error"[82] as knowledge cannot be considered free of error "without returning back upon our steps."[83] This theme would return over and over again throughout Hutton's work as he continued to show in detail the steps that he had covered and their pertinence to the introduction of another stage in the progress of mind. Indeed, the importance of establishing proper first principles was evident in that Hutton believed that

> however small or insignificant in itself may seem an error in first principles, the consequences of such a deviation from the truth of reason, or accuracy of observation, may, in a long deduction, serve to introduce false notions in philosophy, and prove fatal to the establishment of interesting truths, which otherwise might appear.[84]

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[82] PK I, 6.
[83] PK I, 7.
[84] PK I, 47.

But the critical point for Hutton in establishing truth was the need to constantly return to first principles to test the validity of knowledge because

> if false principles be employed in our philosophy, we must either be led to judge erroneously, or to perceive some inconsistency in our science. It is therefore of importance to examine well our principles. Now, the first principles of our philosophy are no other than our natural knowledge, when we *see* and *feel*, in order to *perceive*, and when, in consequence of sensation and perception, we proceed to *judge* and form opinions. This is the first of human knowledge; and, it is upon these, as principles, that the science of metaphysics must proceed.[85]

Therefore, Hutton was adamant that philosophy must begin from unquestionable principles and he thought that the neglect of attention towards proper first principles needed to be addressed as there was "little agreement in the opinions of philosophers, both ancient and modern, with regard to those principles whereon our reasoning, in relation to natural things, proceeds."[86] This lack of consensus was a good enough reason alone, Hutton thought, for the intelligentsia to continue an investigation into the science of metaphysics.

It was also in Part I of *Principles of Knowledge* that Hutton set forth some of his unusual definitions that he applied to common expressions—expressions which he often used ambiguously. Although Hutton did not coin any new words, he did define common expressions with his own definitions which he thought he was applying more accurately than his predecessors. Indeed, Hutton stated in Chapter II—*Distinctions in Knowledge*—that it was important to grasp the terminology he was employing as the "terms knowledge, understanding, science, though in some measure synonymous [[87]], are also employed to express different things."[88] Indeed,

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[85] PK I, xii-xiii.
[86] PK I, 48.
[87] With reference to synonymity Hutton wrote: "It may now be observed, that those distinctions, which have been made with regard to the intellectual process, so far described, are not intended so much with a view to fix the precise meaning and proper application of those terms, in relation to the

although he used the term *knowledge* in its common use to describe the entire intellectual process; Hutton also used *knowledge* to denote the "first step in the intellectual process" consisting of sensation and perception and which was the "primary information of the mind…a thing preserved in the memory; and…afterwards revised in reflection."[89] *Understanding* however was more than "simple knowledge" as *understanding* "requires a judgement to be formed."[90] Indeed, *understanding* was the "discernment of the mind" used in relation to the "simple knowledge"[91] of sensation as things were known first and then distinguished in understanding. Furthermore, *science* was the "discernment of the mind…not upon the simple knowledge of sensation and perception" but instead used "in relation to the knowledge which has been attained by means of the understanding"[92], or in other words, *science* "is knowledge attained by means of analysis."[93] Hutton exemplified this order of knowledge from understanding to science (or "abstracted reasoning"[94]) as follows:

> A and B, for example, may be compared, and a judgement suppose formed of their equality or inequality; the like may be done with regard to B and C; here therefore are two judgements made, or several opinions formed in our mind; and no number of repetition of those opinions are here considered as producing science. The moment however that these two opinions, the equalities of A and B, and of B and C, are contemplated together, in being as it were collated in the mind, and hence a judgement formed with regard to the equality of A and C, things which had not been immediately compared, that instant science is begun. For here, from data which are in the mind, that is to say, judgements or opinions there already formed, (the mind being conscious of that

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progress of the mind, as to establish this proposition, That there is truly a progress made in natural order, which, therefore, is a proper subject for investigation, whatever terms shall be thought most proper for the distinguishing of those several things." PK I, 30-31.

[88] PK I, 16.
[89] PK I, 17.
[90] Ibid.
[91] PK I, 19.
[92] Ibid.
[93] PK I, 29.
[94] PK I, 21.

> operation), a judgement now is formed; and this judgement is new knowledge; produced in the mind, without the operation or immediate intervention of anything besides the faculties of the mind itself.[95]

Therefore, science "only follows understanding, as understanding only follows knowledge."[96] Furthermore, Hutton then used these definitions to summarise the natural progress of the mind from knowledge to philosophy as containing the following steps:

> First, Knowing without understanding, which is knowledge simple and absolute. Secondly, Understanding without reflection; which is knowledge relative, and is commonly considered as knowledge. Thirdly, Knowing by reflection, or knowing our knowledge; which is science, or human understanding; and, lastly, knowing human understanding, or understanding the ends and motives by which a rational being is conducted. This is philosophy, or the perfection of the mind of man, which leads his knowledge towards the Author of his existence, or the natural constitution of things, in knowing causes as well as effects, and in foreseeing future events from the knowledge of that order which obtains in nature.[97]

So it was by taking these steps that man could see the order not only within his mind but eventually within the universe and as a result he would be as certain as possible of God's existence.

In Chapter III—*A General Division of Science, according to the Nature of its different Subjects*—Hutton argued that science is divided into five [[98]] branches: physics, mathematics, morality, logic, and metaphysics; and that each branch rested on principles. The science of physics requires observation of sensation as well as reasoning to establish external or physical truth through perception. Mathematics, on the other hand, requires reason and speculation with truths following conception. Morality, the third division of science, is an internal judging of "good and evil, right

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[95] PK I, 22.
[96] PK I, 21.
[97] PK I, 30.
[98] Elsewhere [PK I, ix-x.] he wrote that the sciences consisted of "mathematics, physics, morality, and theology."

and wrong, like and dislike, approbation and condemnation"; and it is "properly a science" since it is founded in experience and requires "the conscious knowledge of our will."[99] The fourth branch of science was the scientific art of logic and for Hutton logic is language. Indeed, he held that 'logic' had been improperly applied as a term by others as

> it may be made to appear, how unscientifically the term logic has been applied to metaphysical reasoning. Reasoning simply, that is, judging, is a natural operation of the mind; perhaps no mind exists that does not judge, or it is no mind that does not reason in some degree. But reasoning scientifically is more; it is reasoning artificially; and it is proper to man. Whereas reasoning logically is still more than reasoning scientifically; for, it is the expression of our scientific reasoning in language appropriated to that purpose. Now, though both speech and scientific reasoning belong peculiarly to man, yet these ought to be distinguished; for, man may reason scientifically without reasoning logically, that is without expressing in known signs that internal operation of his mind. Whereas man cannot reason logically without reasoning scientifically; for, language or that expression of man's thoughts is itself in science; and unless the subject of man's thoughts be scientifically treated, How is he to communicate to another that operation of his mind which is purely internal?[100]

Hutton's definition for logic on the other hand was that it "is an artificial method of communicating our knowledge, sentiments, and opinions to others by means of audible signs; and also of recording them to ourselves, by means of visible signs."[101] Metaphysics was the fifth branch of science since he thought that there must be an inquiry into how our knowledge is acquired, and it is the "only means by which may be conducted a philosophical research into the nature of things."[102] But although metaphysics was the last of his five sciences "in order of its natural attainment, it may nevertheless be placed first in the order of scientific doctrine, to minds which

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[99] PK I, 37.
[100] PK I, 38.
[101] PK I, 37.
[102] PK I, 40.

have already arrived at science and philosophy."[103] In other words, according to Hutton, all knowledge is examined internally and without initially understanding the first principles as well as the order of the human mind, it would be impossible to determine whether philosophising on other sciences is reliable or not. And as far as the improvement of logic was concerned, as will be shown in the following chapters on language, Hutton wished to go back to first principles and axiomatically build a perfect alphabet "like the elements of geometry."[104]

Chapter IV—*Proposed Method of advancing the study of Philosophy, by remounting to Principles*—is one of the most important chapters in the entire work as it was in this chapter that Hutton set out his scientific method. Since the audience that Hutton was addressing were philosophers, he essentially wished to impart the importance of retracing the ordered mind back to first principles so that they had proper means to test their philosophies. The method was reminiscent of geometry in that the progression of reason must begin from principles which are self-evident, or "unquestionable" as Hutton described them.[105] Throughout *Principles of Knowledge* Hutton would occasionally remind his readers that his method was to return to principles, and while he considered both natural and moral philosophic principles to be equally certain, he also held that this certainty was limited. This, he thought, was so because "in the case of physics, the external thing which acts in giving us knowledge is never known, so, in morals, our information with regard to what happens in other minds of our own kind is always mediate, and in some degree precarious."[106] But, in spite of this limitation Hutton held that the progress of

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[103] Ibid.
[104] PK II, 661.
[105] PK I, 41.
[106] PK I, 44-45.

knowledge in natural and moral philosophy is "neither precarious nor uncertain" since although the acting of external things is never known; on the other hand with the "laws of action or change, being steady and in perfect order" the subject of natural history "may be investigated without error or dubiety."[107] And in the case of the limitation of investigating morals, Hutton held that whatever passes on the minds of others in particular occasions may be precarious; but this "does not affect the general" in acquiring knowledge in moral philosophy "first, from the study of our own mind; and, secondly, in judging from the general appearances, which, being in nature, cannot be supposed to give an information that is false."[108] In other words nature does not deceive, and therefore the truth is to be found in the general and not in the particular.

In Section II—*Of Knowledge, as a Thing in which there may be distinguished different Kinds*—Hutton argued that there are four principles of knowledge: the first principle in the science of metaphysics occurs when a person knows that he knows in reflection so that "the first operation of that mind must be to form this proposition, *I know*."[109] Additionally, when our thinking powers are the subject of our thoughts, in other words, "when I think that *I am*"[110] the mind also has consciousness which is a "species of reflection."[111] This reflecting operation which man possesses is one in which "we have a consciousness of ourselves" [112]and in which "our thoughts, our judgement, and our means of knowledge, are made the subject of our judging and our

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[107] PK I, 45.
[108] Ibid.
[109] PK, I, 73.
[110] PK I, 75.
[111] PK I, 77.
[112] PK I, 76.

thinking powers."[113] The second principle of knowledge is will, for "when I have willed, I know that I have willed."[114] The third principle is action, as the "*mind then acts*" after it has willed.[115] Hutton concluded from the first three principles that there was also a fourth principle, since mind is "a patient" as well as "an agent"[116], and there is

> something besides our mind; and also, that this thing acts; although we may not know what that thing is, nor what it does in order that we should know. For it is only from our knowledge happening without our intention, that we judge, in reason, something to have acted with that intention; in like manner as a thing is known to have happened, in consequence of our proper intention, and by the action of our will. Here is, therefore, a fourth principle.[117]

While Hutton had established these four principles of knowledge, it was not so easy to pinpoint every step in the progress of the mind.

Although Hutton recognised the impossibility of identifying and explaining every stage in the progress of the mind, his attempt to show the numerous faculties from first principles to philosophy was lengthy and complicated. The major stages in the development of mind, according to Hutton, of course began with sensation as it is the "first step in mind"[118] since "this information of the mind by sense, is absolutely necessary to the existence of those things which are performed by its means."[119] Hutton considered pleasure and pain as secondary 'sensations' which he thought "may be called parasitical, as being engrafted upon sensations which are primary."[120] He thought that his theory "supposes sensation to be knowledge absolute and original" and that "every other species of knowledge" is "founded on this, which is

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[113] PK I, 77.
[114] PK I, 80.
[115] PK I, 81.
[116] Ibid.
[117] PK I, 82.
[118] PK I, 94.
[119] PK I, 91.
[120] PK I, 97-98.

first or primary."[121] In Hutton's system the mind had "no power in itself to produce" this absolute knowledge of sensation which followed the action of an external cause.[122] Furthermore, the external source from which the original knowledge was received in sensation (and perception) as an effect could not be known—only inferred. All knowledge (that is, the entire intellectual process) was regarded as either sensation "when the mind is made to feel or suffer" passively, or conception when the mind is active and made to know without sensation.[123] Hutton was here using 'conception' as a general term, in contrast to sensation, to indicate when the mind is active and is not influenced by any external action. But 'conception' was also used by Hutton in a particular way, as a faculty of the mind, which as a "negative term" referred to all knowledge that was not "farther known or understood."[124] Indeed, he thought that it was extremely difficult to distinguish all of the various steps of human understanding in both sensation and conception because of the difficulty of investigating the "close connection of the several operations in which a mind is made to know."[125] Distinguishing sensation from conception due to their lack of connection is simple enough, however these operations of the mind are also distinguished by "having interposed between them the operation of perception."[126] And by distinguishing perception from sensation in the manner that he did, as will be shown later in this chapter, Hutton thought that he had reformed philosophical first principles in a way that rescued natural religion form the scepticism of Hume.

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[121] PK I, 328-329.
[122] PK I, 329.
[123] PK I, 107.
[124] PK I, 200.
[125] PK I, 197.
[126] PK I, 197-198.

The means that Hutton used to establish his first principles was initially, in typical eighteenth century style, to distinguish between mankind and animals. Hutton thought animals possessed the same sort of instincts and capacity for perception as humans, and for Hutton this is "a truth that nothing but the grossest ignorance, with regard to the nature of reason, and strongest prejudice of education, could render in the least degree doubtful."[127] However, animals did not possess the human powers of reflection as Hutton pointed out that it is "only man that seems to have this faculty, which may be termed reflected reason; and, this is the only means for arriving at that rational intelligence which is termed science, and in which the faculty of reason is again reflected, in proceeding from knowledge which is properly understood."[128] And so it was the power of reflection that Hutton pointed out was what distinguishes the human mind from that of the animal and made it possible for him to examine his own reasoning, and "that retrospective view, by which we may contemplate the way wherein we had first blindly or instinctively proceeded to know, is the proper means of advancing farther into this field of intellect; and here the understanding of the mind is founded immediately upon reflection."[129] However, besides the obvious uses of the reflecting power, Hutton believed that it also held significance for philosophers especially since it was indispensable for his method of remounting to principles. Hutton illustrated this by stating that,

> reflecting minds, advancing through an indefinite variety of thoughts, or an indefinite succession of operations, when arrived at high degrees of intelligence by association and comparison, learn also to abstract, in thought, that which is found to be not necessarily conjoined in nature or the actual state of things; and, by proceeding gradually in this operation,

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[127] PK I, 54-55.
[128] PK II, 81.
[129] PK I, 7.

> we at last come to the original knowledge, which had been at first excited in our mind, or the first step of our intellect.[130]

While his method was always to test thought by remounting to principles, the original knowledge or first principles of sensation and perception upon which Hutton's system was founded were distinct (indeed he did not use the term 'sense-perception') and he believed were philosophically superior to those adhered to by his predecessors.

One of the key factors in Hutton's intellectual system is that there is order in mind and progress from the instinctive faculties when the mind is informed through sensation by an external cause. The beginnings of science were to be found while the mind was still in an instinctive condition as it was in "simple understanding" that the "discerning faculty is exerted without, or with little of the abstracting power."[131] Sir William Temple's Brazilian rational parrot [which will be discussed further in Chapter 3] would be an example of a mind with simple understanding but without the power of abstraction. But Hutton asserted that "there is a wide difference between the imitation of a thing that is naturally understood in observation, and the discovery of a thing which is far from being obvious."[132] And he significantly [in light of what will be shown in the following chapters] turned to language and the alphabet to illustrate this point by asking how easy is it "to learn and to employ an alphabet, when once discovered?" while on the other hand "How difficult is it to invent one?"[133] So while Hutton thought that distinguishing and resembling or the "first step of science"[134] occurred as part of the instinctive faculties; it was, in

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[130] PK I, 142-143.
[131] PK I, 497-498.
[132] PK I, 498.
[133] Ibid.
[134] PK I, 494.

addition to the faculty of reflection, the power of abstraction which separated man from animal, and with the combination of abstraction and reflection the mind could discern upon prior distinguished knowledge through a "voluntary operation"[135] thus going beyond simple understanding to intellect or science. Thus,

> The moment that a mind, which has learned instinctively to form compound ideas, begins to discriminate in those ideas, and thus know the principles on which the understanding of the mind is founded, may be said to have made a step beyond the simple understanding of things. This mind is then on the way to understand the nature of knowledge or the proper constitution of a mind, which probably is the highest attainment of a reasoning being. But, alas! How far is this first act from the accomplishment of that proposed end? It is like taking a single step to the East or West, as the first stage in a journey round the world.[136]

Therefore, although merely a 'single step' man's progress beyond the instinctive to science begins once there is a "resolution or discrimination of ideas" from the "composition or association of ideas"[137], as it is "not in knowing, reasoning, or speaking, but in thinking concerning those things which he has already known or distinguished" that man attains science.[138]

In Part I of *Principles of Knowledge* Hutton had considered the instinctive faculties, but in Part II—*Of Science, or the Conscious Principles which lead to Wisdom*—he turned his attention to the "artificial or acquired faculties of mind" which was the investigation of human understanding, or science.[139] Hutton's aim in Part II was to "investigate the principles of scientific reasoning, when man, as a conscious being, proceeds to know the nature of things, and to distinguish truth and falsehood."[140] In other words, after establishing principles in regards to simple and

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[135] PK I, 484.
[136] PK I, 517.
[137] PK I, 564.
[138] PK I, 480.
[139] PK I, 470.
[140] PK I, i.

relative knowledge Hutton then formed principles in regards to knowledge that is known by reflection, which is scientific knowledge. Hutton advanced that the first principle of science is consciousness, or "acting in relation to the simple knowledge of sensation and perception."[141] Or even more simply, "in science the first principle is this, *I know*."[142] Therefore, "the first conscious step in a mind being this, that *I am*, the first step in science is, *I know*, which is as much as to say, I know that I know; for, an animal knows, but he does not know that he knows."[143] In other words, Hutton thought that while an animal can perceive and discern it cannot know that it is perceiving and discerning. But,

> when man, before he thus reasons on his knowledge, shall think or say within himself, I know, I feel, or I think, then he has made a step in knowledge, greater than any that can be made in knowing and reasoning simply, that is, instinctively concerning things. It is in this step, that man knows himself; he then becomes, from a sensitive and discerning animal, a scientific being; and thus enters upon a train of intellectual action, in which he is considered as growing in a system, or proceeding towards the perfection of his purpose.[144]

Having attained this state of conscious reflection, science was also for Hutton the "perception of truth and error"[145] as it was in "knowing *how we know* that any thing is either true or false"[146] since "truth will appear to be the *knowing of knowledge in reflection*."[147] Here then was Hutton's second principle of science, "viz. *that things may be either true or false*, that is to say, either *real* or only *conceived*."[148] So while Hutton thought that science was the "knowledge of knowledge, when man *thinks* for the purpose of his understanding", science was likewise "the perception of truth and

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[141] PK II, 7.
[142] PK II, 3.
[143] Ibid.
[144] PK II, 2-3.
[145] PK I, 477.
[146] PK I, 478.
[147] PK I, 518.
[148] PK II, 8.

error, in the conscious operation of a reflecting mind."[149] And having therefore "acquired those two first principles of science, the knowledge of ourselves and the knowledge of truth, we may then reason in relation to every actual thing that shall be known, and every thought or idea that occurs."[150] But as Hutton's progress of mind had advanced in establishing principles from sense to science, he then advanced further from science to philosophy. Indeed, Hutton's intellectual system progressed from the animal who "simply knows", to science in which man reflects "*that he knows*", and onwards to the philosopher who "knows *how he knows.*"[151]

Certainly, Hutton thought that "No doubt is ever entertained in relation to those truths that originate in our perceiving faculty"[152] and so having perfect first principles meant that if our scientific principles are also correct and "in the disposition of those several principles, no misapplication is committed, the result of this complicated operation, in a mind capable of reason, will be perfect, having all the evidence of certainty of which the nature of things admits."[153] Therefore, Hutton believed that he had properly recognized the progress of mind as,

> It has been shown, that there is a source of actual information, a source which is distinctly different from the faculties of our mind; and that this is not an inert system of extension and figure, but an active system that we are first led to know, simply, in sensation, the passion of our mind; and, secondly, by the changes in that information of sense, we are led, in perception, to imagine extension and direction, and then to figure and conceive things according to a certain order. This perceived order, then, forms the system of nature, or external things, to the knowledge of which we are led by a real information, and in the contemplation of which we must acknowledge the power and wisdom of our Author. But, besides that system of power and wisdom which we are made to know or to conceive, there is a system of pleasure and pain, of happiness and misery, with which we are more immediately concerned. It is in this moral

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[149] PK I, 477.
[150] PK II, 9-10.
[151] PK II, 74.
[152] PK II, 163.
[153] PK II, 223-224.

> system, that the benevolence of our Author is as clearly manifested, to the philosopher, as is the power and wisdom of the Creator in the system of the universe, which we are made in science to conceive.[154]

So it was only those who possessed sufficient intelligence—philosophers—who could understand human nature as the effect of the wisdom and benevolence of a Deity.

Hutton thought that a result of having acquired the state of philosophy was the ability to see order and progress in the study of one's own mind. But it was also at this stage of the progress of mind that man "sees the laws of God, the constitution of his being, or the order of his intellect."[155] In Hutton's natural philosophy [already published in 1792] he had noted that "in every law of nature there is system or design"[156], he was now stating [in his 1794 metaphysics] that the human constitution is "no less the work of God"[157] as the "intellectual system" also "appears to be contrived in all that wisdom and benevolence which is found in nature."[158] Furthermore, at this stage of the intellectual system was to be found Hutton's moral system which he thought had been designed so that philosophy was made "subservient to happiness" and happiness was "benevolently ordained" as the "end, or ultimate, in the intention of the being man."[159] But while the moral system was designed so that humans could achieve happiness it was not one in which God interfered by punishing or rewarding human behaviour. Instead it was one in which the system had been set so that the route to happiness was via wisdom and virtue and once a human had progressed to philosophy in the intellectual system then,

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[154] PK III, 717.
[155] PK II, 595.
[156] Hutton, James. *Dissertations on Different Subjects in Natural Philosophy*. Edinburgh: Printed for A. Strahan, and T. Cadell, London. 1792. 666.
[157] PK I, 218.
[158] PK III, 209.
[159] PK III, 743.

> This philosopher had discovered, that the more good he did to others, the more he increased his own happiness or intellectual pleasure; and he had also found, that this species of pleasure was preferable to that which is immediately derived from sense, when they are to be employed in reflection. He therefore became benevolent upon principle, instead of being benevolent instinctively.[160]

Within this moral system Hutton also touched on how he thought there were principles benevolently designed for society and so Part III—*Of Wisdom or Philosophy, as the Proper End of Science and Means of Happiness*—as well as being part of Hutton's intellectual system contained his moral and social systems which along with the physical system were benevolently designed by God for the happiness of humankind.

Throughout *Principles of Knowledge* Hutton had provided countless examples of design based upon the order of the intellectual system. Of course Hume had argued that order in the universe is not proof that God exists so Hutton had to come up with some other ways to challenge the Humean position. Hutton would occasionally give examples of where others had erred and then he would launch into lengthy revisions, but on other occasions he would use a process of elimination in order to identify truth. But it was also through connecting his systems into a general system that gave Hutton what he thought were double proofs and thus certainty of the existence of God. And the key connection was of his physical and metaphysical systems through revised first principles which included his original theory of perception. Hutton's aim in *Principles of Knowledge* was to connect the material and the intellectual in a general system illustrating how the systems were the benevolent work of a Higher Power. Indeed,

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[160] PK II, 550-551.

> If the motions or actions of material things, proceeding upon established laws of nature, and the actions or motives of men proceeding upon intellectual and moral principles, shall be found properly connected, or necessarily related, in a general system—a system evidently devised in wisdom, and founded on benevolence, this will form a subject worthy of the study of men; a subject important to the constitution of civil society; and a subject most interesting to those who adore wisdom, and who take pleasure in the happiness of mankind. The work here offered to the public, is an attempt to give such a view of the material and intellectual systems,—as being the effect of a supreme design,—as proceeding from one cause,—and as operating to one end.[161]

However, he pointed out that since the principles of metaphysics were still in dispute and that no agreement had been reached as to whether matter was active or passive, then since all science depended upon proper metaphysics a re-examination of first principles was required. Certainly, to obtain a double proof of this he established his first principles both physically and metaphysically. Indeed, it was Part III—*Physical Dissertations on the Powers of Matter and Appearances of Bodies*—of *Dissertations on Different Subjects in Natural Philosophy* (1792) which contained his work on physics. And Hutton noted that it was from his study of physics that he was led into an examination of metaphysics, but it is evident in both his 1792 publication as well as *Principles of Knowledge* in 1794, that his physics and metaphysics were the result of a reciprocal investigation.

The volumes on physics and metaphysics are clearly connected and while Hutton pointed out that he may have been better to have published his metaphysics before his physics, it was nevertheless his physics which appeared in 1792 followed by his metaphysics two years later in 1794. In his 1792 *Dissertations on Different Subjects in Natural Philosophy*, Hutton noted that it was in these dissertations that he wished to "found the physical system of this world, upon principles very different

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[161] PK I, xxxv.

from those which have been generally adopted in natural philosophy."[162] Although he apologized for treating the subject of physics metaphysically, it was by examining the first principles of our knowledge that he founded his physics as it

> is the science of metaphysics, which alone is capable of judging with regard to the principles that are employed in the other sciences; because it goes to examine how we come to know those truths on which, in reasoning scientifically, we proceed to increase our knowledge.
>
> Every person reasons metaphysically who reasons in relation to his knowledge; but few have carried this science so far, as to make it the proper judge of those first principles which are employed in the other sciences; because this requires to have accurately investigated the different sciences, or all the sources of our knowledge, and to have analysed our compound animal or vulgar ideas, so as to arrive at what is absolute in knowledge, and cannot be farther analysed or distinguished in our scientific progress. It is only so far as we thus proceed to examine our first principles, that we shall arrive at science which is perfect, or without error.
>
> The importance to natural philosophy of the subjects here in question, and the necessity of having recourse to the only science competent for the examination of first principles, will plead my excuse for here introducing so much metaphysical argument in a work where nothing but physical subjects are concerned.[163]

But it was reasoning in this metaphysical way on matter which not only became pivotal for his general system but also distinguished Hutton from his predecessors.

The existing paradigm regarding the theory of matter was based on the Newtonian concept that the universe consisted of particles which were "*solid, massy, hard, impenetrable* and *movable*."[164] Indeed, Newton had written in the *Principia* that,

> The extension, hardness, impenetrability, mobility, and inertia of the whole, result from the extension, hardness, impenetrability, mobility, and inertia of the parts; and hence we conclude the least particles of all bodies

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[162] Hutton, *Natural Philosophy.*, xi-xii.
[163] Ibid., 299.
[164] Oldroyd, David. *The Arch of Knowledge: An Introductory Study of the History of the Philosophy and Methodology of Science.* New York & London: Methuen, 1986. 83.

> to be also extended, and hard and impenetrable, and movable, and endowed with their proper inertia.[165]

Moreover, Newton later expanded upon his idea of matter in his 31st Query (of Book III—Part I) of the *Opticks*, in which he wrote that,

> it seems probable to me, that God in the Beginning form'd Matter in solid, massy, hard, impenetrable, movable Particles, of such Sizes and Figures, and with such other Properties, and in such Proportion to Space, as most conduced to the End for which he form'd them; and that these primitive Particles being Solids, are incomparably harder than any porous Bodies compounded of them; even so very hard, as never to wear or break in pieces; no ordinary Power being able to divide what God himself made one in the first Creation.[166]

However, in spite of being a Newtonian in many respects[167], Hutton criticised Newton's nature of matter as he stated that,

> The commonly received philosophy supposes, that bodies are composed of atoms which are absolutely inert, or of particles of matter (as they are called), which are infinitely hard, and perfectly incompressible. Here we find two palpable errors, disgraceful to science, and baneful with regard to natural philosophy. First, there is metaphysical or philosophic error, in pretending to remount to principles of physical body, and then assuming, as those principles, nothing but bodies themselves under the pedantic designation of atoms or corpuscles, having definite volume and figure, as if names were to alter things in other respects the same. Secondly, there is a physical error, in supposing with the vulgar, and the most ignorant in physical observations, that hard bodies are not perfectly compressible, that is, always diminished in their volume when power is applied for that

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[165] Newton, Isaac. *Sir Isaac Newton's Mathematical Principles of Natural Philosophy and his System of the World* Translated into English by Andrew Motte in 1729… ed. F. Cajori. Berkeley & Los Angles: University of California Press, 1934, as cited in *The Arch of Knowledge: An Introductory Study of the History of the Philosophy and Methodology of Science* by David Oldroyd. New York: Methuen, 1986. 98. n121. (op cit note 94., 1934. p.399)

[166] Newton, Sir Isaac. *Opticks: or, a Treatise of the Reflections, Refractions, Inflections and Colours of Light.* (4th edition) London: Printed for William Innys, 1730. 375-376.

[167] Hutton's Newtonianism has been well-documented in P.M. Heimann and J.E. McGuire's 'Newtonian Forces and Lockean Powers: Concepts of Matter in Eighteenth-Century Thought' in *Historical Studies in the Physical Sciences*. Edited by Russell McCormack. Philadelphia: University of Pennsylvania Press, Third Annual Volume, 1971. 233-306.; P.M. Heimann's '"Nature is a Perpetual Worker": Newton's Aether and Eighteenth-Century Natural Philosophy' in *Ambix* Volume XX, No. I—March, 1973. 1-25.; P.M. Heimann's 'Voluntarism and Immanence: Conceptions of Nature in Eighteenth-Century Thought' in *Journal of the History of Ideas*, Volume 39, No. 2 (April-June, 1978) 271-283.; and Richard Olson's *Science Deified & Science Defied: The Historical Significance of Science in Western Culture.* Volume 2: From the Early Modern Age through the Early Romantic Era, ca. 1640 to ca. 1820. Berkeley: University of California Press, 1990.

> purpose; for, if hard bodies be compressible, as they truly are, we would have no right to attribute incompressibility to their particles, or to the principles of their constitution.[168]

Therefore, Hutton thought that matter had to be examined from both a physical and a metaphysical standpoint and it was his original theory of perception as part of his first principles of metaphysics which was the key that unlocked this theory of matter on which the rest of Hutton's physical and intellectual systems were built.

The challenge to the existing paradigm regarding the nature of matter made by Hutton from a physical standpoint was made in his 1792 *Dissertations on Different Subjects in Natural Philosophy* in which he thought it was evident that,

> if the resistance, which is opposed by a natural body to the exertion of our will endeavouring (sic) to destroy the volume, should be as perfectly overcome, as is that of hardness and in fluidity, then the common opinion of mankind, which supposes the extention (sic) of a body to be permanent, would necessarily be changed. For, at present, we think that this resisting power, which preserves volume in bodies, is absolutely in its nature insurmountable, as it certainly is in relation to our moving power.
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> Instead then of saying, that matter, of which natural bodies are composed, is perfectly hard and impenetrable, which is the received opinion of philosophers, we would affirm, that there were no permanent property of this kind in a material thing; but that there were certain resisting powers in bodies, by which their volumes and figures are presented to us in the actual information, which powers, however, might be overcome. In that case, the extention (sic) of the most solid body, would be considered only as a conditional thing, like the hardness of a body of ice, which hardness is, in the aqueous state of that body, perfectly destroyed.[169]

So matter could only be known through its active power which could be utilized in either "exciting motion and resistance among perceived things" or in "changing the sensible qualities of those things which are perceived."[170] Therefore, by examining the sensible qualities and the perceptible qualities of changes in bodies then a

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[168] Hutton, *Natural Philosophy*., 669.
[169] Ibid., 289-290.
[170] Ibid., 237.

conclusion formed in reason, that is an inferred quality, could be concluded "in like manner as a mathematical proposition is demonstrated and believed with no less confidence than the axiom on which it had been founded."[171] Furthermore, it was Hutton's correction of his predecessor's first principles which was the key to his entire system and this he was equally forthright about in his physical dissertations as he was in his metaphysics. Indeed, he pointed this out to his audience as he wrote that,

> If I am wrong, in giving an unjust representation of our philosophic principles, and I have reasoned ill, in endeavouring to correct that error in our science, the physical work, which is founded upon this examination of our knowledge, will deserve little attention from those who are thus satisfied with the present state of their philosophy. But if that defect of our first principles be acknowledged, and the proposed correction be approved of, men of science, whose object is to pursue truth, will be inclined to examine carefully every step that may be employed, in proceeding upon those grounds, and in forming theories for the explanation of natural appearances.[172]

Thus Hutton's system of mind and universe, of natural and moral philosophy was founded upon his first principles of distinct faculties of sensation and perception through which he was able to formulate a theory of matter.

Since Hutton believed that natural phenomena could only be accounted for empirically whilst believing that all knowledge is internal, it was vital to uncover how both the metaphysical and the physical were ordered. So it was by separating sensation from perception that he organized his first principles of the mind to show how external information was processed. Sensation was absolute knowledge; whereas perception being a compound of both sensation and conception meant that Hutton had interpreted that in the order of mind a faculty existed whereby the absolute knowledge of the effect of the external cause was combined with internal

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[171] Ibid., 285.
[172] Ibid., xii.

conceptualization. It was through the application of perception that Hutton was able to distinguish between matter and body and therefore to upturn the existing paradigm in regards to the theory of matter. John Playfair showed how Hutton had distinguished between *matter* and *body* as he noted that,

> we do by no means explain the nature of body, when we describe it as made up of small particles; because if we allow to these particles any magnitude whatsoever, we do no more than affirm that great bodies are made up of small ones. The elements of body must, therefore, be admitted to be something unextended. To these unextended elements, Dr Hutton gave the term of MATTER, and carefully distinguished between that term and the term BODY, which he applied only to those combinations of matter that are necessarily conceived to posses impenetrability, extension and inertia.[173]

And it was in fact by distinguishing between *body* and *matter* Hutton was able to avoid falling into a trap that so many of his predecessors had done as,

> Body is an extended thing, of definite dimensions, consequently figured; it is capable of being moved; and, when moved, it is capable of retaining that motion, or of imparting it to another body. Matter, on the other hand, is an unextended or an indefinitely extended thing, according as it is considered metaphysically or physically. By indefinite or conditional extension, as applied to matter, I mean, that the greatest quantity may be comprised in the smallest space, and the smallest quantity may occupy the greatest space. But, whatever matter is of itself, it must be considered as the cause of motion and resistance in natural bodies; and this is all that we are permitted to judge of in the science of physics.[174]

Therefore, Hutton believed that matter was active resistance and not passive solidity as his predecessors had done. Indeed, Hutton believed that the concern of natural philosophy was to "investigate the powers or laws of action, by which material things are made to undergo those changes that constitute the system of this world."[175] But of course, Hutton noted that it is impossible to know what matter is and that only the effect of matter is known "in the action of natural things" and that it was "from

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[173] Playfair, 'Biographical Account', 75.
[174] Hutton, *Natural Philosophy.*, 315.
[175] Ibid., ix.

this known effect that matter, as the active cause, must be inferred."[176] Although Hutton thought that it was impossible to know what matter is, "we certainly may know what it is not"; and he noted that it was clearly not body, "an extended, definite, moveable thing, which is properly considered as passive or inert."[177] Therefore, by this method Hutton found that "matter must be active, and a cause for that which in a physical body we perceive."[178] Indeed, it was through the perception of bodies and motion which Hutton held that our knowledge of matter and substance was inferred.

Another two years passed until 1794 when Hutton published his theory of perception in *Principles of Knowledge*. This theory tied together his physics and metaphysics and performed what he thought was a double proof that his first principles were sound while challenging the Newtonian position concerning matter. In Part I of *Principles of Knowledge* Hutton noted that until then philosophers had reasoned upon first principles without science and that the only purpose of their arguments was "to discover the fallacy of each others reasoning."[179] Instead and "in order to proceed upon true principles" Hutton thought that "there are truly such erroneous opinions, which are employed in our philosophical speculations" and "that it is only in this metaphysical science that those errors may be properly or best corrected" in order to proceed in physical speculations.[180] But, had proper first principles been found or completely understood "in like manner as with regard to geometry, where the principles are undoubted" then all philosophers would be in

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[176] Ibid., 315.
[177] Ibid., 315-316.
[178] Ibid., 316.
[179] PK I, 52.
[180] PK I, xvi.

agreement as to what they are.[181] So Hutton's investigation into what amounted to proper first principles was the most crucial part of his philosophy since,

> If this is the nature of human understanding, as consisting neither in knowing what external things are in themselves, nor what that thing is which in us thinks, but in discerning various relations, with regard to the operations of our mind and those of an external cause, or in distinguishing the passion of the mind, by which we are made to know and act without thinking, and the action of the mind, by which we are made to think or to conceive without reason or reflection, this may be made the subject of a philosophical inquiry. And, if in this inquiry, any discoveries shall be made, with regard to those primary operations where knowledge is produced, and where the intellect is made to grow; or if any errors shall be detected, in the principles on which philosophic reasoning proceeds, this examination may be attended with important consequences, both in relation to physical and metaphysical philosophy. For, in reasoning, so much is built upon a few first principles, that the smallest reformation or correction in the beginning of such a series, may lead in the end to a conclusion very different from what had been before deduced; and thus, principles which had been before received, may, in reasoning with more attention, be found erroneous, and may be formed.[182]

And having held that all of the sciences must be examined through a proper understanding of the human mind, and since he considered physics as being the first science to be examined; Hutton thought that the way forward was to inquire into the faculties that are used in the science of physics, "whereby we have received that knowledge and understanding, which is found in our thinking principle previous to more general science, and which serves as the basis of our reasoning when entering on philosophy."[183] Indeed,

> our scientific notions, of material things, are not acquired without the study of our own thoughts; and, the study of our thoughts cannot be made, to any proper purpose, without our understanding having been deeply and extensively informed in the science of physics. We cannot know ourselves, without forming the distinction of knowledge and opinion; we cannot advance in natural philosophy, without making the distinction of body and matter. But, in the distinction of knowledge and

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[181] PK I, 52.
[182] PK I, 58-59.
[183] PK I, 41.

> opinion, we necessarily include the influence or effect of an external thing; and, in the distinction of body and matter, we must have recourse to the conscious operations of our mind, by which we abstract or analyse our natural knowledge, in order to form principles or scientific opinions.[184]

So Hutton endeavoured to investigate and to form first principles that would be found to be exact so that enquiries into natural and moral philosophy could be made accurately as

> in order to establish natural philosophy upon a basis that will remain unshaken, and stand the test of all examination, the science of physics, on which it is to be built, must be reformed, in correcting the errors of the vulgar, with which, even in this inlightened (sic) age, it will be found as yet infected.[185]

Therefore, Hutton believed that if his discovery in regard to original knowledge was to be deemed successful then consequently both metaphysical and physical reasoning would need to be built upon solid first principles.

In the *Preface* of *Principles of Knowledge* Hutton restated what he had told his readers in *Dissertations on Different Subjects in Natural Philosophy* that,

> Our natural philosophy has been founded upon this ground, *That matter is inert, extended, solid, and impenetrable*; and, this we believed, as supposing it to have been learned from the examination of natural bodies or actual things, the only information by which that knowledge is to be attained. But, from the most accurate and strict examination of those external things, we now find no reason for concluding any such property in matter; because, there is no such property in the things which we examine.[186]

But furthermore in the *Preface* of *Principles of Knowledge* Hutton noted that,

> The metaphysical system of philosophy, which is commonly received, is founded upon the physical notions of material things, so far as those things are considered existing externally with magnitude and figure, and thus affecting our mind by means of those properties. But the physical system, which I have given in those dissertations, is plainly inconsistent with that received metaphysical system; therefore, it was necessary for

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[184] PK I, x-xi.
[185] PK I, 43.
[186] PK I, xvi-xvii.

> me to shew (sic) wherein those received physical and metaphysical notions were erroneous, or inconsistent with natural appearances. This I endeavoured to do, in the first of those physical dissertations; and this I considered as a subject so far adapted to that place in a physical work, as well as it is to this place in a metaphysical dissertation, where our notions of matter form the subject of examination.[187]

Therefore, Hutton's aim was to obtain proof that his philosophy was correct from both a physical and a metaphysical perspective. It was of course through perception that "extension, direction, magnitude, and figure are made known"[188], so Hutton investigated the relationship of sensation and perception and he explained that,

> sensation, which is knowledge, may be considered as an effect, proceeding from the action of a cause, a thing external in relation to the mind in which the knowledge exists; but that this effect, when existing as knowledge in the mind, may also be a cause in relation to an action of the mind, which will then conceive, and thus form another species of knowledge, which is perception, a process of mind in which figure is known in connection with sensation. When, therefore, sensation is thus considered as the cause of our knowledge of figure, it is not that any of our bodily organs excites this knowledge of figure in the mind, as they do the knowledge of sensation, but the organ excites the knowledge of sensation, and this knowledge excites, or is the cause for, that action of the mind by which the conception of the conception of figure is made. It is observing this order of things, that the nature of perception will be properly understood.[189]

Thus in Hutton's first principles perception is an intermediate stage between sensation and conception in which the mind is excited passively by sensation and actively through conception. Indeed, perception is "neither simply knowledge as distinguished from conception, nor pure conception as distinguished from sensation; and this must be esteemed an operation different from either of those two, so far as it is properly compounded of them both."[190] But although this compound includes conception it is nevertheless a purely instinctive faculty as the active part of

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[187] PK II, 395.
[188] PK I, 329.
[189] PK I, 149.
[190] PK I, 194.

perception has been made only as a consequence of the mind being excited passively in sensation as

> the knowledge or idea of magnitude and figure is not acquired in sensation, considered as the passion of mind knowing immediately in consequence of the action of a thing which is external; but that this is attained by the proper action of the mind itself, then conceiving knowledge, and therefore forming to itself those ideas of magnitude and figure,—not voluntarily, as it is performed on other occasions when imagination operates without perception, but instinctively, or necessarily in consequence of a feeling, by which the mind is excited to this mode of action, wherein a certain conception is formed.[191]

Therefore, since, in the progress of mind, perception was within the instinctive faculties or first principles of knowledge, "there is no deception; for, here we are led by nature to form the conception of extension, and to imagine figure, ideas as necessary to our animal constitution as to the progress of our science."[192] So since Hutton believed that nature could not deceive, then his perception along with sensation were the first principles that he used to build his general system on connecting the intellectual and physical systems.

As he had advanced in his physics, Hutton reiterated in his metaphysics that while matter should be considered as "the substance, essence, or principles of external things"[193] it was only body in which magnitude and figure could be perceived. The cause of our knowledge then, for Hutton, was the "*power* to act, *power* to affect and be affected"; and *power* he thought should "be considered as a term implying an unknown thing in action, or the action of a known thing, to both of which this term may be applied."[194] In other words, matter and power as far as

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[191] PK I, 138.
[192] PK I, xxvii.
[193] PK II, 399.
[194] PK II, 393-394.

experience was concerned, were "found to mean the same thing."[195] Berkeley, having disagreed with Locke that things with magnitude and figure were the cause of sensation, denied the existence of an external world. But Hutton thought that it was "absurd" of Berkeley to have jumped to this conclusion and that this was "concluding without premises, at least, if not contrary to principles."[196] While Hutton believed that "external things, as we conceive them, do not exist independent of our mind", that was not to say that there was no external world.[197] Indeed, through Hutton's theory of matter

> it has been shewn (sic), that material things are ultimately resolvable into power and energy. Consequently, there is nothing really external, besides cause and action; although we most erroneously imagine that there are things existing with magnitude and figure, besides the activity which we perceive as proceeding according to rules wisely conceived in the constitution of this world.
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> Material action, therefore, is all reduced to those general laws of efficiency which we comprehend in gravitation, in light, heat, &c. in elective attractions and repulsions. It is nowise concerned with magnitude and figure, which are pure conceptions in our thought, and are produced by the action of our mind.[198]

So while there can be no knowledge of matter through perception; matter can "be inferred as an active power that causes our sensations."[199] Therefore, Hutton thought that although we can only know internals, it was through the effects of the external world on our senses that he believed in the existence of an external world which was in direct contrast to Berkeley. Metaphysically Hutton wrote it is impossible to form a concept of matter because it is "the last abstraction, or that which remains after abstracting every thing known; and thus, it is a judgment of our mind, respecting something truly existing, unknown, but in reason understood, that is, known in

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[195] PK II, 403.
[196] PK I, 334.
[197] PK III, 163.
[198] PK III, 241.
[199] O'Rourke, 'A Comparison', 10.

reason only, and not in sense."[200] Therefore, the metaphysical idea of matter was derived from perceptions of external objects; whereas the physical idea of matter was arrived at by way of the idea of power.[201] So Hutton believed that,

> Matter, as a term, must either belong to physical knowledge, or to that which is properly metaphysical. If it be physical, we have no right to attribute to this thing any other than the properties by which perceived things are made known to us, or which we in this route of science believe as belonging to external things. In this case, therefore, matter would mean no more than the parts of bodies which are too small to be perceived, or the minute division of bodies beyond the examination of the senses by which the greater bodies are made known. Matter, as a physical subject, cannot be judged of from any thought of our mind, or any conscious principle which we have of our proper knowledge; for, matter is the principle of that which we cannot know consciously, as being extrinsic in relation to mind; and it would be as absurd to judge the nature of matter, in that case, upon metaphysical principles, as it would be to describe the nature of mind upon those of mathematics, or to conclude *a priori* the effect in physical action, or the succession of natural events.
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> If, on the other hand, the term matter is to be considered as metaphysical, or as properly to be judged of from our knowledge of ourselves, and from our understanding the principles of our knowledge, then, matter, though a principle in things which are perceived, is not to be considered as having in that magnitude and figure, which in our animal opinions or common understanding we necessarily judge as belonging to external things, but which, from science more accurate, we judge to be in the imagining and conceiving power of our mind. Matter, in this view, will appear to be a thing absolutely different from that external thing which is perceived by our mind; and the proper attribute of matter will be, the having power to affect our mind in making us to know. This is all that matter has in relation to our mind of knowledge; and this is the proper metaphysical idea of matter.
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> Having thus taken a view of the physical and metaphysical ideas of matter, we must be satisfied that this is a complete investigation of the subject.[202]

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[200] PK II, 394.

[201] Heimann, P.M. and J.E. McGuire. 'Newtonian Forces and Lockean Powers: Concepts of Matter in Eighteenth-Century Thought' in *Historical Studies in the Physical Sciences*. Edited by Russell McCormack. Philadelphia: University of Pennsylvania Press, Third Annual Volume, 1971. 233-306. 286.

[202] PK II, 406-407.

And so having examined matter from both perspectives, Hutton concluded that his predecessors had erred and that he had found a new and proper system of knowledge founded upon just first principles of both physics and metaphysics.

By making perception a compound of sensation and conception, as well as being an instinctive operation of the mind, Hutton's theory of perception was considered innovative. Indeed, he noted that "to this day the subject of perception, as here understood, has been untouched"[203]; and the review of *Principles of Knowledge* in *The Analytical Review* stated that his "theory of perception is new, and we hesitate not to say, ingenious, consistent, and well supported."[204] Hutton informed his readers that it was this enquiry into physics that prompted him into conducting a metaphysical investigation as

> having found principles, which superseded the necessity of believing in the commonly received opinion, with regard to matter and bodies; and having found, that volume, in natural bodies, may be only a thing imagined in our mind, I entertained a suspicion, that the employing this property of body as a principle in natural philosophy, like those of mathematical figures, might be only a supposition; consequently, that the scientific definitions of matter, taken from this quality of body, were mere conjecture, and only founded upon the vulgar notions of men. This led me to inquire into the nature of our knowledge, when we judge in relation to this subject, volume and figure.
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> It was here that I discovered, as I persuade myself, the principle upon which our knowledge of magnitude and figure is founded; and, this science, being distinctly different from that of physics, led me to examine metaphysics, as the proper science to which this subject of our knowledge then belonged.[205]

Consequently, Hutton not only developed metaphysical means to support his physics but he subsequently constructed an entire 'general system' that connected his *Dissertations on Different Subjects in Natural Philosophy* and his *Principles of*

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[203] PK I, 161.
[204] *The Analytical Review; or, History of Literature, domestic and foreign, on an enlarged plan: Volume XXI—May 1795* London: J. Johnson, 1795. 460.
[205] PK I, xv.

Knowledge into a full physical and metaphysical system. Indeed, initially Hutton "began to form a metaphysical theory, for the support of a physical theory"[206] and in fact in *Dissertations on Different Subjects in Natural Philosophy* he wrote extensively on metaphysical issues especially the instinctive faculty of perception, as it was "in thus applying to metaphysics" that Hutton believed that he had "obtained a perfect confirmation" of his physical theory.[207] But in several cases within *Principles of Knowledge* he also referred to illustrations which he had made in *Dissertations on Different Subjects in Natural Philosophy* as it was "in reconciling" his metaphysical speculations "with matter of fact or the phenomena of nature", that Hutton "procured a confidence in that abstract science, to which the principles employed in the other sciences are to be submitted."[208] Therefore, it was as the result of these reciprocal speculations between physics and metaphysics that Hutton "acquired a desire to cultivate the science, in which man is made to *know himself*" and consequently he studied metaphysics "for its own sake."[209] As a result of these enquiries Hutton's general system then was built upon his first principles that he had confirmed both physically and metaphysically and which he believed were perfect.

Hutton's theory of perception had given him what he concluded was a double proof—both physical and metaphysical—that his first principles were proper and that his philosophy was built on bedrock. On the other hand as his approach was often to revise the positions of his predecessors, he pointed out where Locke and his followers, Berkeley and most notably Hume, had gone wrong in the assembling of their first principles. Hutton's aim in mapping the progress of knowledge was to

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[206] PK I, xvi.
[207] PK I, xxxii.
[208] Ibid.
[209] Ibid.

establish the order of the mind; whereas he noted that Locke had "inverted the natural order of things" by confusing instinctive and conscious ideas.[210] Indeed, sensations for Hutton were "original and primary" whereas Locke had considered them as secondary; and while Locke thought that solidity and extension were "original and primary", Hutton maintained that these are "certainly only secondary, so far as these follow in consequence of sensation, which in the production of knowledge, or progress of mind, is primary."[211] As a result, Hutton believed that Locke had reasoned erroneously "when he assigned things with magnitude, figure, and motion, as the cause of our sensation; for, nothing is more evident, than that it is only by means of sensation that we attain to the knowledge of things with magnitude, figure, and motion."[212] And while Hutton thought that "we are made to know by external information" through sensation and perception (that is, *knowledge*); it is only when we reflect on sensation and perception that this "is properly termed idea."[213] Indeed, Hutton pointed out that Locke had expressed how 'ideas' were produced erroneously as "Mr Locke says, a snow-ball has the power to produce in us the ideas of white, cold, and round; whereas he should have said, it has the power to produce the knowledge or sensation of white and cold; and that then the mind has the power to produce the idea of that knowledge."[214] And in the case of 'understanding', Hutton believed that this was an operation that was beyond sensation and perception and required the mind to make a judgment and so he criticised Locke as,

> The powers to produce in us that knowledge, he [Locke] calls qualities in external things, which things are then contrasted with the mind; and, as these qualities are sensations or perceptions in our understanding, he

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[210] PK I, 325.
[211] PK I, 325-326.
[212] PK I, 333.
[213] PK I, 322.
[214] PK I, 320.

> [Locke] calls them ideas; but, it is evident, the term understanding is here improper, being employed in place of mind, which is, on this occasion, contrasted with the external thing. Nor is this to be considered as a frivolous distinction, for, understanding is an operation of mind, and is performed posterior in relation to knowledge and idea.[215]

In other words, Locke had not only confounded sensation and perception as well as understanding in relation to knowledge and idea; he had also "confounded idea and knowledge" which Hutton believed were "perfectly distinct."[216] As Locke had failed to distinguish between knowledge and idea it was impossible for him to have produced a theory of perception similar to Hutton. Indeed, he had fallen into the trap "of considering our ideas as representing external things, when truly they represent nothing but our knowledge."[217] Now as Hume had been influenced by Locke regarding ideas, Hutton was then critical of Hume as,

> Mr Hume considers all human knowledge as consisting of ideas, of which he says there are two kinds, one strong and lively, the other faint and weak. Now it is knowledge and idea, that Mr Hume here considers as things of the same species, and only differing in degree. No wonder that a philosopher reasoning upon those principles, should find some difficulty in distinguishing truth and fiction, reality and fancy, and thus should be led, in his philosophy, towards scepticism.[218]

And so instead of criticising Hume's sceptical conclusion, Hutton chose to attack the first principles upon which Hume had grounded his philosophy thus undermining Hume's scepticism. Consequently, Hutton believed that he had pointed out the errors in the first principles and—since so much depended upon first principles—the philosophies of Locke, Berkeley and Hume.

Now since he thought that he had perfect first principles Hutton also thought that he was in a position to persuade his philosophical audience that even at their

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[215] PK I, 321.
[216] PK I, 319.
[217] PK I, 331.
[218] PK I, 322.

advanced state of intelligence the correct way to proceed in philosophy was by 'remounting to principles' as "no science can be perfect, or absolutely free from scepticism, unless it be traced to its principles."[219] Furthermore, Hutton believed that when he and his audience were scrutinising their philosophies it was still "necessary to analise (sic) our principles, and thus remount from step to step, until we either arrive at the error, or deduce the principle from that primary knowledge of the mind which is unerring."[220] Thus science should proceed in the "inverted order of our natural knowledge"[221] as,

> Our knowledge is considered as proceeding from that which is absolutely simple, to that which is compound; and this is the natural progress of the mind in general, or, this is the case before such a mind has become a conscious being in reflection. But here again, our knowledge of our knowledge, or our understanding of our knowledge and ideas, which is the progress of a conscious mind, must be considered as proceeding, in an inverted order, compared with that of our natural knowledge, that is, it proceeds from the compound to the more and more simple. It is only when we can separate the most compound idea into its different parts, and, by subdividing these, trace them to the knowledge which is original and simple, that we fully understand the compound natural idea, and that we have formed the highest abstracted ideas, which are absolute and original.[222]

Therefore, it did not matter how intelligent a philosopher was, if they did not use both analysis and synthesis to great affect then according to Hutton they could not arrive at truth.

Hutton thought that his *a posteriori* progress of the mind to philosophy inferred that there were intellectual, natural and social principles that had been ordered by God benevolently for the happiness of mankind. However, illustrating proof after proof of design including order in the mind was of course no challenge to

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[219] PK I, xxi.
[220] PK II, 280.
[221] PK I, 294.
[222] PK I, 294-295.

Hume's scepticism. So Hutton's system contained several ways in which he argued for theism. Among them was an argument indicating that since man is limited in his powers then there must be a God. Although humans cannot be the cause of their sensations and Hutton states that it must be God who is ultimately the cause, he does not indicate exactly how but merely rules out alternatives. Another of Hutton's theistic arguments was that happiness through virtue and wisdom would not occur if God or nature deceived us. And in keeping with his methodology he reasoned on this *a posteriori* and thought that anyone could test these positions. In another of his arguments for theism Hutton eliminated the alternatives of polytheism and atheism by reasoning that there can only be one positive principle. And since scepticism cannot be a conclusion then theism must be the only conclusion possible. The connection through first principles of physics and metaphysics was another way in which Hutton thought he had proved the existence of God. If it is in man's constitution to uncover how the universe is designed then there can only be a single explanation that is true and so by elimination all other explanations are false. Having joined first principles in the physical as well as the metaphysical areas Hutton thought that he had double proof of a single explanation. Furthermore, since those who could understand both physics and metaphysics were limited to a few, it was mostly in this respect that Hutton was directing his philosophy to a restricted audience. And he believed that if his audience could understand his work then there would be no reason for them not to believe that the universe was designed. Because the individual parts of Hutton's system do not rigidly depend upon each other many modern interpretations of Hutton have ignored the relationship between the parts and have missed how in checking the consistency of his theories in relation to his

theology that "there is more happening than meets the eye."[223] Therefore, Hutton's argument for design was reinforced in a number of ways including being "buttressed with the epistemological and elimination arguments."[224]

In his opposition to Hume, Hutton also took issue with one of the most celebrated aspects of Hume's philosophy: cause and effect. Again, he chose to attack a specific area of Hume's theory so as to undermine it in its entirety as he believed that cause and effect is the "most important object perhaps of our inquiry; for, unless we judge of the truth in those ideas…instead of leading to philosophy, our science might terminate in scepticism."[225] Hutton argued that Hume had confused the order of our knowledge through sensation with the idea of causation. Indeed, in his *An Enquiry Concerning Human Understanding* Hume had written that, "When we reason *a priori*, and consider merely any object or cause, as it appears to the mind, independent of all observation, it never could suggest to us the notion of any distinct object, such as its effect; much less, show us the inseparable and inviolable connexion between them."[226] Hutton quoted this passage as evidence of Hume's "misunderstanding" of cause and effect since he believed that we can only acquire the idea of connection in reason.[227] Hume's illustration of the connection of cause and effect as occurring in experience was that,

> It is certain that the most ignorant and stupid peasants—nay infants, nay even brute beasts—improve by experience, and learn the qualities of natural objects, by observing the effects which result from them. When a child has felt the sensation of pain from touching the flame of a candle, he will be careful not to put his hand near any candle; but will expect a similar effect from a cause which is similar in its sensible qualities and

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[223] Galbraith, *James Hutton*, 24.
[224] Ibid., 28.
[225] PK II, 162.
[226] Hume, David. *Enquiries concerning Human Understanding and concerning the Principles of Morals* edited by L.A. Selby-Bigge. Oxford: Clarendon Press, 1975. 31.
[227] PK II, 180-181.

> appearance. If you assert, therefore, that the understanding of the child is led into this conclusion by any process of argument or ratiocination, I may justly require you to produce that argument; nor have you any pretence to refuse so equitable a demand. You cannot say that the argument is abstruse, and may possibly escape your enquiry; since you confess that it is obvious to the capacity of a mere infant. If you hesitate, therefore, a moment, or if, after reflection, you produce any intricate or profound argument, you, in a manner, give up the question, and confess that it is not reasoning which engages us to suppose the past resembling the future, and to expect similar effects from causes which are, to appearance, similar. This is the proposition which I intend to enforce in the present section. If I be right, I pretend not to have made any mighty discovery. And if I be wrong, I must acknowledge myself to be indeed a very backward scholar; since I cannot now discover an argument which, it seems, was perfectly familiar to me long before I was out of my cradle.[228]

But Hutton pointed out that in this instance Hume was "only considering an object of natural history, which respects the order of our knowledge"[229] and therefore Hume's idea of causation was not accurate since the relationship of cause and effect is not a related pair of external things but is instead a way in which the mind orders events. Further in his response to Hume, Hutton noted that,

> a philosopher must not allow himself to fancy, that he is reasoning with regard to cause and effect, while he is only putting a question with regard to the natural succession of events, the knowledge of which requires sensation, memory, and discernment, or must be ascertained by observation and experience; neither is it to be concluded, that because reasoning cannot here proceed to form a judgment *a priori*, therefore, experience should give us the conception of cause and effect without the use of reason; observation itself cannot discover either effect or cause.
>
> But this process of observation and experience, accompanied with reason in relation to events, necessarily suggests conclusions in conscious and reflecting minds, or employs the faculty of judging, in like manner as the proper impression of the organ or action of the external cause necessarily excites sensation; and it is by reasoning on what has passed in sensation, or has been transacted during those operations in the mind, that the relative ideas of effect and cause are produced or conceived, not perceived. The observation of light or a body of flame is one event, and the sensation of heat another; of themselves, those different events have not any relation or the smallest affinity; but, being connected properly in place and time by the action and consciousness of

[228] Hume, *Enquiries.*, 39.
[229] PK II, 181.

> our mind, there is hence formed an idea or conception of those things thus related; this idea, however, is formed in reason, not in sense.[230]

Therefore, the connection of cause and effect must take place in the mind and so Hume was mistaken in his philosophy. Hutton pointed out that Hume had fallen into the trap that had befallen many of his other predecessors as having confused metaphysical and physical ideas since,

> Mr Hume, therefore, makes a very improper question, when he inquires for the connection or relation of cause and effect, as he may very properly do with regard to flame and the feeling of heat, or snow and the feeling of cold. Cause and effect, properly speaking, are abstract general relations; and, the connection of these is necessarily understood, in the knowledge of this order in our thought. In a metaphysical investigation, he may properly inquire, how we acquire the knowledge of cause and effect, in like manner as, reasoning physically, we inquire after the connection or proper relation of flame and heat; but, there to alledge (sic) that cause and effect are known, while we are ignorant of their connection or relation, is to reason metaphysically with physical ideas; and, this will certainly introduce error into our philosophy.[231]

Hutton thought that this was in fact a significant error that Hume had made since,

> This theory, concerning the progress of the mind in knowledge, so far as our moral sentiments and actions are not thereby affected, would appear, to mankind in general, to be as trivial in its purpose as it is abstracted in its nature. But, to a philosopher, who is to contemplate nature as contained in the material and intellectual systems, and to consider things as existing without and within the mind, the subject here examined is, of all others, the most important, seeing that it is only in distinguishing what is the proper object of sense, and what is the operation of our thinking principle, that any solid judgment may be formed with regard to what really exists in nature, and what eventually exists only in our mind.[232]

Therefore, by poking holes in Hume's theory of causation and thus rattling the foundations of his philosophy, Hutton thought that he was undermining the scepticism of Hume.

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[230] PK II, 193-194.
[231] PK II, 182.
[232] PK II, 200.

There were other ways in which Hutton dealt with scepticism as he noted that if there was no uniformity in nature then we would be unable to understand it since "understanding is founded upon similarity, or, it is in assimilating our knowledge that we understand scientifically."[233] However, in the case of the idea of chance when it is

> applied to cause, it is a negative proposition, implying, that we see no design. When the same term is applied to effect, we are apt to persuade ourselves that the proposition is positive, as when we say, that we see nothing but disorder in the thing. But here we only deceive ourselves; disorder is no absolute thing, it is only negative, implying, that we do not perceive the order of what has come to pass.
>
> That material things should be ruled by chance, is either a confused idea or a contradictory expression. If there is any order in material things, there must be design; for, the one of those expressions necessarily implies the other. Consequently, if there be any design perceived in the order of things, there can be no chance; for, chance is only a negation of design.[234]

Overall though Hutton thought that "Scepticism is the doubting upon a general—an universal principle of disbelief. But, there is no such general principle; on the contrary, there is nothing in nature but belief; and doubting is properly in science."[235] So having ruled scepticism as a negative or an "artificial" principle of "disbelief"[236] then it cannot be an universal in human nature. Indeed,

> A general principle of disbelief is synonimous (sic) with, or equal to, a general principle of ignorance. But, what would mean a general principle of ignorance? Would this be any other than the knowing of nothing? But, such a state of mind would be the farthest from a principle; and, it is the greatest misunderstanding to confound, with this, the knowledge of our ignorance; for, before a mind can know its ignorance, it must know wherein it knows; and this, if employed as a principle in reason to conclude, is the very opposite of scepticism. Thus, inordinate scepticism, however competent to defeat prejudice, ends in absurdity, and prepares a

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[233] PK II, 176-177.
[234] PK II, 178-179.
[235] PK II, 80.
[236] PK II, 299.

> triumph to the common sense of mankind, in opposition to the abstract reasoning of science.[237]

This final remark "separates Hutton as much from Hume as from Hume's critic Reid"[238], since Hutton believed that it was only those who were philosophers who could properly understand physics and metaphysics thus comprehending the design of both material and human nature.

In terms of a first cause on which Hutton's entire system was built he reasoned that,

> no man of rational understanding can find any principle for concluding that there is no first cause; for, this necessarily implies, that he understands how things could be produced without a cause. Now, if a man has seen this truth, *That things may be produced without a cause*, he has but to reveal it, that so it may be believed by other men; but, to deny the existence of a first cause, from no other reason than this, *that to him the first cause is unknown*, would be equally absurd, as to deny his own existence, because he knows not how he had a being.
>
> Thus we will be justified in affirming, that the first cause is absolute, self-existing, efficient, and final.[239]

The final cause was human happiness and it had been benevolently intended so that "Man is actuated in his moral conduct by two different motives…the sensual and intellectual."[240] The human constitution is designed so that mankind then has "a double part to act…on the one hand, his animal nature to maintain, and his species to preserve; on the other, he has to acquire an independent source of pleasure, in the enjoyment of his proper thought, in order to complete his happiness when animal pleasure shall decay."[241] Indeed, happiness could only be achieved by abstaining from overindulgence in sensual pleasures and instead being led through the moral principles leading to virtue, philosophy and ultimately happiness. Therefore, this

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[237] Ibid.
[238] Jones, Peter. 'An Outline', 189.
[239] PK III, 136.
[240] PK III, 612.
[241] PK III, 613.

"intellectual system, or design of virtue"[242] was a natural progress in which human nature is the effect of wisdom and benevolence as "Human nature, therefore, is the cause of virtue; and, virtue is naturally the cause of happiness."[243]

It took Hutton 2,173 quarto pages to investigate the progress of reason from the universal animal instincts to the natural religion of the few in *Principles of Knowledge* and in spite of his efforts it has been largely ignored. Since he did not hold an academic position there were no protégés that might have retold or modified Hutton's philosophy. But while Playfair took the trouble to extract Hutton's deism from his *Theory of the Earth* thus popularizing it in his *Illustrations of the Huttonian Theory of the Earth*, the by then out of fashion deist position remained unedited in *Principles of Knowledge*. However, the main reason that Hutton's philosophy has been neglected is due to its writing style and thus how difficult it is to read as the "repetitious character of Hutton's work often obscures his thought or line of reasoning"[244] Although Hutton's writing has been criticized for being dense, repetitive and prolix, what has never been taken into consideration is that Hutton himself wrote regarding his composition style in the Preface to *Principles of Knowledge*:

> an author who has to support a theory which is opposed by the natural prejudice of mankind, and by the received doctrines of a philosophy founded upon those vulgar notions, labours under a certain disadvantage. If he illustrate (sic) his theory, in applying it to every particular with which it is concerned, the work becomes voluminous, and his readers are disgusted with frequent repetitions, which he is necessarily induced to make, in order to illustrate a doctrine which is not familiar to them. If, again, to avoid that evil, he shall give the theory without those illustrations, in leaving the particular applications to his reader, his doctrine runs the risk of being condemned; not from being inapplicable

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242 PK III, 334.
243 PK III, 743.
244 Gerstner, Patsy A. 'James Hutton's Theory of the Earth and His Theory of Matter' in *Isis*, Volume 59, No.1. (Spring, 1968) 26-31. 28. n13.

> for the explanation of our opinions, as it ought, but from the occasional difficulty of making those applications, that is, from misstatement of the case, misunderstanding of a new doctrine, and misapplication of the principles.
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> The theory, if just, must be applicable to every particular appearance and event; but, to trace the general in every particular, is not always easy…Here then are two evils, which appear to me in this case unavoidable, but, of which an author may make a choice; I have therefore preferred that which I think the least, viz. prolixity, in bringing the theory to the test of many particular applications, and exposing the subject in many different points of view, in order to have it fully considered.
>
> The proper object, of this work, is not to give a book which should please the reader, either by the elegance of the composition, or by flattering fallacious opinions which he may have entertained; nor is it to make proselytes of those who can only believe upon authority, or in superstition, without seeing proper evidence: It is to give to those, who may be willing to correct their prejudices and able to analise (sic) their thoughts, the means of examining their opinions, and of judging for themselves, by reasoning in the strictest rules of science, with regard to a subject where the data are neither deficient nor beyond the reach of the inquiring mind.[245]

This extraordinary passage has never been taken into account and whilst Hutton is difficult to read, it is unfair that writers have commented upon the prolixity of *Principles of Knowledge* without acknowledging Hutton's unusual intentions.

While it has been ignored, until now, that Hutton himself warned his readers in the Preface of *Principles of Knowledge* what to expect in his style of composition; he did in fact note that "there are two difficulties which attend this undertaking" in regards to "both the author and the reader."[246] In addition to the "method or composition", the second difficulty that he cautioned in reading his work was regarding the "matter or doctrine of the work"[247] or the "nature of the subject."[248] And this other difficult aspect of reading *Principles of Knowledge* has, again, never been taken into account when writers have commented upon the obscurity of

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[245] PK I, xxx-xxxi.
[246] PK I, xxix.
[247] Ibid.
[248] PK I, xxx-xxxi.

Hutton's writing, and as a result Hutton has suffered undue criticism. The subject that Hutton was referring to was physics since it was his inquiry into physical principles that first led him to inquire into metaphysics. And regarding this subject matter that would present another difficulty for his readers, Hutton wrote that,

> Without understanding that physical investigation, with regard to the nature of bodies, which has been given in another place [[249]], the metaphysical process, here employed for establishing the nature of our perception, may perhaps appear to many (who may not follow every step of the investigation) as purely chymerical (sic). Because, judging from a false appearance, with regard to the solidity of those bodies which we perceive, and not seeing the full force of the metaphysical demonstration, the proposition here maintained, with regard to the nature of magnitude and figure as the creature of our imagination, must seem to them as founded on nothing but supposition. In like manner, without the metaphysical investigation which is given in this work, and by which we come to understand the nature of our opinions, men of science, who may see the full force of the physical argument against the absolute solidity of bodies, will still be doubtful, in allowing that conclusion which is so strongly opposed by their prejudice or animal ideas.
>
> But, in examining the subject both *physically* and *metaphysically*; and, after seeing clearly how we perceive by means of sense without any real solidity, and how we deceive ourselves in reasoning from false appearances in those supposed things, we shall have every sceptical notion, as well as every natural prejudice removed; we shall so far understand the nature of external things, in knowing what they *are not*; and we shall so far understand our own nature, in knowing what we actually *do* in order to *perceive*. Such, at least, is the result of that investigation in my mind; and, such were the motives and method of my inquiry.[250]

This was also a warning that the nature of his subject could not be understood by all who read it and that his audience was restricted as, "it is only to those who are learned in the science of physics, or who understand the nature of things, that such a chain of reasoning, as is necessary for leading to the science of metaphysics, may be properly undertaken, or can be rendered intelligible."[251] Indeed, Hutton believed that

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[249] Hutton, *Natural Philosophy*., Part III.
[250] PK I, xxxi-xxxii.
[251] PK I, ii.

only a small group of the intelligentsia could understand his system and it was therefore only the few who had advanced their intelligence to natural religion.

Another confusing aspect of reading Hutton's work is how he published his physics [1792] before his metaphysics [1794] as it may have been easier to comprehend if he had published his metaphysics first since he would not have had to include metaphysics in his physics and then physics in his metaphysics. Hutton apologised for publishing in the confusing order that he did as,

> I would here beg leave to refer the reader to the dissertation upon the laws of matter and motion already quoted; he will there find the application of this doctrine to subjects of natural philosophy. In that preliminary dissertation, there is some metaphysical reasoning, (perhaps improper in a physical work), which would have been unnecessary, if this metaphysical work had preceded those physical dissertations.[252]

In addition to this chronological confusion was the bewildering inordinate use of examples. But when it came to his examination of first principles in which he made the connection between physics and metaphysics the reason for his excessive use of examples was made clear as,

> What has required so much repetition of this fundamental part of the doctrine, is the general opinion of mankind, who believe the direct contrary; for, it is thought that external bodies really exist as they appear to the thinking principle, that is, with magnitude, figure, colour, &c.; and, when a reflecting mind considers these several qualities separate and distinct, this is thought to be an abstract speculation; as if that conception had not a foundation in reality, and did not necessarily flow from the nature of our knowledge, whose principles are all simple, absolute, and distinct.
>
> But if, in consequence of the present investigation, a proper distinction shall be made of the judgment, or fruit of the discerning faculty, and the first knowledge on which the discerning faculty of mind proceeds, it will be admitted, that it is the abstract passion of mind excited in sensation, and the abstract action of mind employed in perception, which constitute those principles of our understanding here termed knowledge. Consequently, the abstracting operation of reflecting minds, (distinguishing the several qualities of length, breadth, and colour, &c. in

[252] PK II, 395.

> bodies) will appear to be a natural progress of intelligent minds, advancing in an order opposite to that of infant minds, when these are learning to form ideas, and thus to know the natural appearances of things.[253]

The examples of others mistakes is tedious and while Hutton noted the difficulty involved he did feel that it was important to include them so that he could strictly test his own philosophy as

> error has no place in science, properly speaking, no more than in instinctive reason, which is nature. We are however so little accustomed to that propriety of speech, or to that rigour of scientific language which is so usefully employed in mathematical reasoning, that it is sometimes difficult to express to others, by terms employed so often in lax senses, ideas that may be clear in a man's own mind; it is therefore necessary so often to illustrate with examples, perhaps not always properly adapted to the purpose, and to use tedious repetitions of the same thing in varied expressions.[254]

Nevertheless, reading Hutton's 'prolix' and 'repetitious' *Principles of Knowledge* is arduous and in this respect it is not surprising that it has been neglected.

There is one further reason why Hutton's philosophy is so difficult to read and that is due to the manner in which he employed geometric reasoning throughout. Although Hutton never claimed to have been a stellar mathematician, Playfair noted that he did however possess an "aptitude of his mind for geometrical reasoning" which was "proved on many occasions"[255] and this was to be of great importance in shaping the arguments of his *Principles of Knowledge*. Hutton's writing was not presented in a mathematical style but it did display a geometric influence with illustration upon illustration until he had exhausted all angles that an issue could be investigated from as well as defending all perspectives from which his work could be

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[253] PK I, 489.
[254] PK I, 442.
[255] Playfair, 'Biographical Account', 92.

attacked. Indeed, Hutton thought that the correct method "employed by philosophers, is that of definition, axiom, and proposition."[256]

This geometric method employed in Hutton's metaphysics was as in geometry founded in solid first principles. Indeed, in order to establish "clear and uncontrovertible" principles for natural philosophy, Hutton thought that "the examination of first principles must appear to be the proper means for attaining that which is required."[257] And it was only once he had properly defined and distinguished axiomatic first principles in metaphysics that philosophical propositions could be built knowing that there was already truth in the axioms. Subsequent judging in relation to these axioms, that is propositions "which follow in consequence of axioms" become principles themselves as propositions are "formed in succession, by employing the truths before discovered; and in this manner, science is advanced, by a similar employment of the rational faculty, always judging in relation to acquired principles."[258] While propositions were purely intellectual, that is they were seen by Hutton as being completely scientific; axioms were formed upon instinctual knowledge and he noted that "Science, therefore, is only perfect, so far as the intellectual process is compleat (sic), and so far as the propositions or truths employed have been founded upon axioms."[259] This geometric reasoning was in fact central to Hutton's science as, "In scientific reasoning, knowledge is produced by steps; in each of these a principle is acquired on which to proceed in reasoning, and thus acquire a further step. It will thus appear, that, in science, there is no

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[256] PK II, 28.
[257] PK I, 53.
[258] PK II, 30.
[259] PK II, 31.

certainty without seeing every step."[260] This in essence is the geometric method. However, the overuse of illustration employed throughout Hutton's writing has subsequently led to criticism resulting in his metaphysics being ignored and consequently the misunderstanding of Hutton and his works.

The root of Hutton's geometric reasoning most probably derived from his time as a student at the University of Edinburgh where he studied under Professor Colin MacLaurin who was the most brilliant and celebrated mathematician of the time and as Playfair pointed out, that "Of the masters under whom he studied there, MacLaurin was by far the most eminent, and Dr. Hutton, though he had cultivated the mathematical sciences less than any other, never mentioned the lectures of that celebrated Professor but in terms of high admiration."[261] Hutton began his studies at the University of Edinburgh in 1740 when geometrical reasoning was instilled in the students of Colin MacLaurin's elementary class not just as a schooling in mathematics but so that they would initially be filled with sound philosophical principles. This could be described as a first principles examination of first principles. Indeed, in Scotland there was a "pedagogical superiority of geometry over algebraic analysis" and the reason for this was that it was believed that "Geometry kept one aware of the steps of reasoning involved in a mathematical argument and algebra did not; therefore, geometry was better for training the intellect than algebra."[262] And this Scottish tradition, of the link between geometry and philosophy continued until the nineteenth century when Sir William Hamilton probably best summed up its importance to intellectual development by writing that,

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[260] PK II, 285.
[261] Playfair, 'Biographical Account', 39.
[262] Olson, Richard. 'Scottish Philosophy and Mathematics 1750-1830' in *Journal of the History of Ideas*, Vol. 32, No. 1. (January-March, 1971) 29-44. 42.

> The mathematical process in the symbolic method (i.e. the algebraic) is like running a rail-road through a tunnelled mountain; that in the ostensive (i.e. the geometrical) like crossing a mountain on foot. The former carries us, by a short and easy transit, to our destined point, but in miasma, darkness and torpidity, whereas the latter allows us to reach it only after time and trouble, but feasting us at each turn with glances of the earth and of the heavens, while we inhale health in the pleasant breeze, and gather new strength at every effort we put forth.[263]

Hamilton was also here reinforcing the significance of geometry to the Scottish educational tradition, a tradition that was broad and general as opposed to the specialised analysis of algebra. Moreover, he believed that geometry has "always been reckoned as the transition study from the concrete to the abstract, from the science of matter to the science of mind"[264] And it was within this geometrical and philosophical Scottish pedagogical tradition that James Hutton's intellectual development was nurtured.

Colin MacLaurin graduated from the University of Glasgow in 1713 where he was a student of Robert Simson who was Professor of Mathematics from 1711 until 1761. Simson also taught Matthew Stewart, John Robison, and Adam Smith, and in restoring the ancient Greek geometry, especially through his *The Elements of Euclid*, he not only shaped Scottish mathematics but was influential in forming Scottish pedagogical practices. Indeed, Simson wrote in the Preface of *The Elements of Euclid* that it was his intention to restore the,

> Elements to their original Accuracy…since these Elements are the Foundation of a Science by which the Investigation and Discovery of useful Truths, at least in Mathematical Learning, is promoted as far as the limited Powers of the Mind allow; and which likewise is of the greatest Use in the Arts both of Peace and War, to many of which Geometry is absolutely necessary.[265]

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[263] Hamilton, Sir William., *A Letter to the Lord Provost*. 1838. as cited in *The Democratic Intellect* by George Elder Davie. Edinburgh: Edinburgh University Press, 1961. (1999 reprint) 127.
[264] Ibid., 128.
[265] Simson, Robert. *The Elements of Euclid*. Glasgow: Robert and Andrew Foulis, 1756.

The Scottish pedagogical tradition was a general education and by utilizing geometry as illustrating how the mind operates the initial schooling in geometry was subsequently of critical importance in the development of the Scots philosophers. Furthermore, the connection of geometry and geometric reasoning to the other disciplines was a key component in the general education of the eighteenth century at a time when there was thought to be a unity of the sciences. But specifically as MacLaurin's biographer Patrick Murdoch wrote,

> In the first or lowest class, (sometimes divided into two) he taught the first six books of *Euclid's* Elements, plain trigonometry, practical geometry, the elements of fortification, and an introduction to algebra. The second class studied algebra, the 11th and 12th books of *Euclid*, spherical trigonometry, conic sections, and the general principles of astronomy. The third class went on in astronomy and perspective, read a part of Sir *Isaac Newton's Principia*, and had a course of experiments for illustrating them, performed and explained to them. He afterwards read and demonstrated the elements of fluxions: those in the fourth class read a system of fluxions, the doctrine of chances, and the rest of *Newton's Principia*.[266]

Therefore, it was under the guidance of MacLaurin whose use of geometry was paramount that Hutton's education transpired on a solid footing, but it was also through this examination of geometry which emphasised philosophical principles that Hutton would have developed further as,

> The same emphasis on cultural and liberal values which characterised the work of the elementary mathematical class was also found in the advanced class. In fact, just as the introductory class was taught its Euclid and its arithmetic in a very philosophical way, so the treatment of the calculus in the third and highest mathematical class was dominated by an obsession with the question of metaphysical foundations.[267]

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[266] Murdoch, Patrick. 'An Account of the Life and Writings of the Author' in *An Account of Sir Isaac Newton's Philosophical Discoveries, in four books* by Colin Maclaurin. London: A. Millar et al., 1748. v.

[267] Davie, George Elder. *The Democratic Intellect*. Edinburgh: Edinburgh University Press, 1961. (1999 reprint) 111.

And while it was Simson who "more than anyone" was responsible for the "tie-up between mathematics and scholarship and philosophy"[268]; it was MacLaurin who transmitted this method to Hutton as part of a general education that was a "broad, uniform curriculum of Scottish tradition, with its subjects drawn from the three fields of language, philosophy, and science."[269] It was within this tradition that James Hutton received his education, an education with which he went on to become a genius not only in science, but philosophy and indeed language.

Hutton's thoughts on religion were also reminiscent of Colin MacLaurin's and it has previously been noticed that Hutton "closely followed Maclaurin's language in inferring God's wisdom and foresight from nature."[270] Indeed, in one of many examples MacLaurin wrote that,

> natural philosophy is subservient to purposes of a higher kind, and is chiefly to be valued as it lays a sure foundation for natural religion and moral philosophy; by leading us, in a satisfactory manner, to the knowledge of the Author and Governor of the universe. To study nature is to search into his workmanship: every new discovery opens to us a new part of his scheme. And while we still meet, in our enquiries, with hints of greater things yet undiscovered, the mind is kept in a pleasing expectation of making a further progress; acquiring at the same time higher conceptions of that great Being, whose works are so various and hard to be comprehended.[271]

Similarly Hutton wrote that,

> instead of making that metaphysical investigation subservient only to physical science and natural philosophy, I discovered a much more important end for metaphysical inquiry; this was, the making natural philosophy subservient to a general system, in which the nature or constitution of *things* must be considered as the proper means of *intellect*; a system, in which the human intellect appears to be the benevolent intention of the first cause; a system in which man is made to understand

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[268] Ibid., 109.
[269] Anderson Robert D. "Comments" in *Universties, society, and the future*. ed. Nicholas Phillipson. Edinburgh: Edinburgh University Press, 1983. 160-166. 161.
[270] Grabiner, 'Maclaurin and Newton', 149.
[271] MacLaurin, Colin. *An Account of Sir Isaac Newton's Philosophical Discoveries, in four books* published by Patrick Murdoch. London: Printed by A. Millar et al., 1748. 3.

> his proper happiness, in seeing its causes; and a system, in which man, knowing his greatest good, is made to act voluntarily in having a conscious choice, and to conform his will to the wise laws of human nature,—laws which he thus learns in studying the constitution of his own mind,—and laws which he cannot learn without admiring the benevolence in which they have been ordained.[272]

So in addition to the geometric, Hutton may have been influenced by Colin MacLaurin—his professor at the University of Edinburgh—in other respects such as moral philosophy and natural religion.

Another possible way in which Hutton was influenced by MacLaurin was from what MacLaurin had written about bees. In explaining the progress from the instinctive to the scientific faculties, or animal to human operations, Hutton offered an interesting illustration by showing that science is only to be attained by humankind while juxtaposing the instinctive operation of a bee's hexagonal cell as opposed to the scientific operation of a mathematician in the drawing of a hexagon.[273] Philosophers throughout the centuries, for example Pappus of Alexandria and Johannes Kepler, had made speculations regarding the hexagonal form of the cells of the bee's honeycomb. Indeed, there is a "vast literature through the centuries mentioning the bee as a geometer…During the 18th century, the mathematical architecture of the honeycomb was viewed as evidence of a great teleological tendency of the universe."[274] With Hutton using the example of a bee's instinctive operation, this was quite possibly another instance of how Hutton had been influenced by Colin MacLaurin. Certainly, MacLaurin would have been working on his "Of the Bases of the Cells wherein the Bees diposite (sic) their Honey" which was later published in *The Philosophical Transactions* [*of the Royal*

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[272] PK I, xxxii-xxxiii.
[273] PK I, 509.
[274] Hales, T. C. "The Honeycomb Conjecture" in *Discrete & Computational Geometry*. New York: SpringerVergal, 2001. Volume 25, 1-22. 2.

Society of London] while Hutton was one of his students at the University of Edinburgh. It was in this work that MacLaurin wrote that,

> the *Bees* do truly construct their Cells of the best Figure, and that not only nearly, but with Exactness; and that their Proceeding could not have been more perfect from the greatest Knowledge in *Geometry*. How they arrive at this, and how the wonderful Instinct in Animals is to be accounted for, is a Question of an higher Nature.[275]

Even from this short passage it is possible to demonstrate a great deal of the influence that MacLaurin most likely had on Hutton's philosophy, teleology and indeed his geometric reasoning.

While Hutton was a student at the University of Edinburgh he was also greatly influenced by Professor John Stevenson. Indeed, at the beginning of Playfair's biography of Hutton is an account of an illustration made by Stevenson that was clearly influential to Hutton's intellectual development.[276] Stevenson made the point that gold can be dissolved in *aqua regia*. This 'kingly water' is a mixture of nitric and hydrochloric acids which separately can dissolve base metals, but when united they dissolve the 'noble' or precious metals of gold and platinum. This illustration deeply impressed Hutton and led to a life-long interest in chemistry. But as well as influencing his intellectual activities it was also to become lucrative in influencing his business interests as his chemical knowledge was instrumental in the success of his sal ammoniac business which made him financially independent. However, although much has been made since Playfair's biography of how Stevenson was the main influence in Hutton's development due to this *aqua regia* illustration, it could have also been made in MacLaurin's class as part of Hutton's

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[275] MacLaurin, Colin. "Of the Bases of the Cells wherein the Bees diposite (sic) their Honey" (Presented 3 November, 1743) in *The Philosophical Transactions* [*of the Royal Society of London*]. London: W. Innys, C. Hitch, T. Astley, et al., 1747. Volume IX, Part III—The Anatomical and Medical Papers, 2-5. 5.

[276] Playfair, 'Biographical Account', 39-40.

introduction to Newton since it is dealt with in Newton's 31st Query[277] which he would have read whilst a student in MacLaurin's class. Nonetheless, it was in Stevenson's Logic and Rhetoric class that Hutton was introduced to Locke's *Essay Concerning Human Understanding* which would have had an enormous impact on his thinking as well as Berkeley's *Treatise Concerning the Principles of Human Knowledge*, and certainly it was in this class that most of Hutton's formative learning on metaphysics and language took place.

The education that Hutton received at the University of Edinburgh especially from Stevenson and MacLaurin laid the groundwork for his later thoughts on science, philosophy and language. But it was also from the education that he received from MacLaurin based upon the revival of Euclidean geometry by Robert Simson that most likely led to Hutton's aptitude for geometric reasoning and it was this reasoning applied to his writing that many of his readers have found difficult. Indeed, the trouble as far as reading and understanding Hutton is concerned, is that, to use Hamilton's analogy, he is 'crossing a mountain on foot'; but just as the reader feels that Hutton is moving forward, all of a sudden he decides to halt his progress by defining how far he has progressed up to that point, and instead of gathering 'new strength' Hutton exhausts his readers with constant repetition of what ground he has previously covered before he embarks on a new step forward. So as he moved through the order of mind progressively at each stage Hutton reiterated what he had proved to be self-evident and built upon that with illustration upon illustration to demonstrate each new step along the way and the reader is left with an at times seemingly endless stumble across a Himalayan-style expedition. And it was this

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[277] Newton, Sir Isaac. *Opticks: or, a Treatise of the Reflections, Refractions, Inflections and Colours of Light.* (4th edition) London: Printed for William Innys, 1730. 357-358.

style of composition which contained Hutton's geometric reasoning that led to criticism by some of the reviewers of *Principles of Knowledge*.

The first review of *Principles of Knowledge* was by *The Analytical Review*.[278] While it contained some criticism for being a "ponderous work"[279], for the most part it praised Hutton as his

> talents for physical investigation we remarked with pleasure on a former occasion: his abilities as a metaphysical inquirer will be amply attested by the work before us. Ingenuity of invention, perspicuity of judgment, with a spirit of free inquiry unfettered by any undue deference to ancient systems, or great names, constitute a claim to praise, which the doctor possesses in no small degree.[280]

However, the writing style of Hutton received considerable condemnation as it was thought that the "form in which it is presented, we are sorry to say, is in many instances not only inelegant, but to every reader of taste highly offensive and forbidding."[281] Nonetheless, this review also noted that the style of Hutton's writing should in no way

> detract from the general merits of the work, which we deem deserving of the highest commendation, or to derogate from the author's well-founded claims to literary honour.—This investigation alone would justly intitle him to a distinguished rank among the philosophers of the present age, and we dismiss it with returning him our grateful acknowledgements for the pleasure and the improvement we have reaped from its perusal.[282]

Indeed, *The Analytical Review* found particular merit in Hutton's theory of perception which was deemed as "ingenious and correct."[283] Furthermore, *The Analytical Review* also recognized Hutton's theory of language and commented on

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[278] *The Analytical Review; or, History of Literature, domestic and foreign, on an enlarged plan:* Volume XX—October 1794. London: J. Johnson, 1794. 149-162; Appendix to the Twentieth Volume—September to December 1794. London: J. Johnson, 1795. 449-465; Volume XXI—May 1795. London: J. Johnson, 1795. 449-460.
[279] Ibid., Appendix to the Twentieth Volume—September to December 1794., 449.
[280] Ibid., Volume XX—October 1794., 149.
[281] Ibid., Volume XXI—May 1795., 460.
[282] Ibid.
[283] Ibid., Volume XX—October 1794., 158.

the originality of his theory of orthography.[284] The second of the contemporary reviews was by *The English Review* which totaled eighty-seven pages over eleven issues.[285] Again it directed criticism at Hutton's style of writing as "although often animated, and sometimes eloquent, it is yet not unfrequently (sic) debased by vulgar and unusual expression."[286] But it also heaped praise on Hutton as "the opinions of the author are so new, so bold, and so remote from common habits of thinking, that they must soon attract the attention of the philosophical world."[287] In addition, Hutton's theory of language was thought to be "ingenious."[288] And while *The English Review* wrote that it would be "presumptuous" to give a "decisive opinion", it was thought that Hutton's *Principles of Knowledge* "has evidently employed many years of thought and investigation, and which is, perhaps, to be considered as the boldest and most singular inquiry that this age has produced into the philosophy both of nature and of mind."[289] A third review by *The British Critic*[290] noted that *Principles of Knowledge* was "comprehensive beyond comparison."[291] And a fourth and particularly harsh contemporary review was made by *The Critical Review* but not until three years after publication in 1797.[292] It began with an attack on the printer since apparently it was a source of annoyance that, "Five times the printer reminded us of the length of time this work has been upon our hands"; but the review

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[284] Ibid., Appendix to the Twentieth Volume—September to December 1794., 465.
[285] *The English Review; or An Abstract of English and Foreign Literature*: Volume XXIV December 1794. 431-443; Volume XXV January 1795. 42-49; February 1795. 120-125; March 1795. 201-206; April 1795. 289-295; May 1795. 378-382; June 1795. 414-419; Volume XXVI July 1795. 24-32; August 1795. 95-100; September 1795. 166-173; October 1795. 252-263. London: H. Murray, 1795.
[286] Ibid., Volume XXVI, October 1795., 263.
[287] Ibid., Volume XXVI, October 1795., 262.
[288] Ibid., Volume XXV, May 1795., 382.
[289] Ibid., Volume XXIV, December 1794., 431.
[290] *The British Critic:* Volume VI—September 1795. 217-229.; October 1795. 366-374.
[291] Ibid., Volume VI—October 1795. 374.
[292] *The Critical Review; or, Annals of Literature, extended and improved. A new arrangement,: Volume XIX March 1797.* London: A. Hamilton. 308-315.

itself was ruthless as "we are dragged without mercy through the science of philosophy, and the philosophy of science—through the theory of idea, and the idea of theory, till we know not whether we stand upon our head or our heels."[293] Again, the style of Hutton's writing came under attack as *The Critical Review* noted "we wish that he had paid a greater degree of attention to style, language, and composition."[294] Indeed, some advice was given as "we recommend our author to cut his work down to the size of three duodecimos, when we promise him to examine it with still further attention; and also we assure him, that not only the number but the satisfaction of his readers will be greatly increased."[295] But *The Critical Review* did offer some commendation most notably for Hutton's theory of language especially his "thoughts on spelling, which deserve praise."[296] Nevertheless, *The Critical Review* declared that "we shall congratulate any student who can get through the three volumes by fair reading, without meeting as many disappointments as ourselves."[297] However, as it was published in the March 1797 edition it was unlikely that Hutton read this merciless review since he died on the 26th March 1797.

Hutton's legacy has been marred due to the obscurity in his writing, and his non-geological work including *Principles of Knowledge* has been essentially forgotten. In fact had Playfair not rewritten Hutton's *Theory of the Earth* it too might have resulted in oblivion. Playfair was equally critical of Hutton's writing abilities as he noted that,

> Truth, however, forces me to add, that other reasons certainly contributed not a little to prevent Dr Hutton's theory from making a due impression on the world. It was proposed too briefly, and with too little detail of

[293] Ibid., 308.
[294] Ibid., 311.
[295] Ibid., 315.
[296] Ibid., 312.
[297] Ibid., 308.

> facts, for a system which involved so much that was new, and opposite to the opinions generally received. The descriptions which it contains of the phenomena of geology, suppose in the reader too great a knowledge of the things described. The reasoning is sometimes embarrassed by the care taken to render it strictly logical; and the transitions, from the author's peculiar notions of arrangement, are often unexpected and abrupt. These defects run more or less through all Dr Hutton's writings, and produce a degree of obscurity astonishing to those who knew him, and who heard him every day converse with no less clearness and precision, than animation and force. From whatever causes the want of perspicuity in his writings proceeded, perplexity of thought was not among the number; and the confusion of his ideas can neither be urged as an apology for himself, nor as a consolation to his readers.[298]

Others among Hutton's contemporaries were of a similar opinion as, when in his biography of Joseph Black, his friend Adam Ferguson wrote that,

> Having said so much of Hutton in this occasional notice, so far short of his merits, it may not be improper to prepare those who may consult him as an author, to meet with a disappointment for which his friends could never rightly account. Though uncommonly luminous and pleasant in conversation, he was obscure, unintelligible, and dry in writing, to an equal degree...In company, he spoke to be understood by such as were present, and when obscure, was called upon to explain himself. But alone, he was not aware that others could be at a loss for a meaning so clear to himself...his very ingenious conceptions, to be received as they ought, must come from some other pen than his own.[299]

Of course it was Playfair's pen that rescued and popularized Hutton's geology when he published *Illustrations of the Huttonian Theory of the Earth*[300] and he was well-qualified to do so. Certainly, in the nineteenth century Sir Archibald Geikie believed that it was not only Playfair's friendship with Hutton nor his understanding of geology that made him best qualified to popularize Hutton's geology, but it was that he was "Gifted with a clear penetrating mind, a rare faculty of orderly logical arrangement, and an English style of altogether remarkable precision and

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[298] Playfair, 'Biographical Account', 61-62.
[299] Ferguson, Adam. 'Minutes of the Life and Character of Joseph Black, M.D.' from Volume V of *Transactions of the Royal Society of Edinburgh*, (Edinburgh: Royal Society of Edinburgh, 1805) 101-117. 115.
[300] Playfair, John. *Illustrations of the Huttonian Theory of the Earth*. Edinburgh: Cadell & Davies, 1802.

elegance."[301] In fact Geikie thought that "For precision of statement and felicity of language" the *Illustrations of the Huttonian Theory of the Earth* had "no superior in English scientific literature."[302] But although Playfair was aware that all of Hutton's writings are difficult to read it was only Hutton's geology that he chose to popularize in spite of the fact that both Adam Ferguson and Dugald Stewart suggested that he extend his popularisation to Hutton's metaphysics. Indeed, while Dugald Stewart noted that although Hutton had been an "amiable and excellent friend", and "so ingenious and original in his writings as a geologist and natural philosopher"; he also thought that Hutton was "often so dark and even incomprehensible as a metaphysician."[303] Nevertheless, Stewart additionally wrote that Hutton was

> a philosopher eminently distinguished by originality of thought, and whose writings could not have failed to attract much more notice than they have yet done, if the great variety of his scientific pursuits had left him a little more leisure to cultivate the arts of composition and of arrangement.[304]

But Stewart suggested, as Ferguson had done, that Playfair should rewrite Hutton's metaphysics since,

> It would be fortunate, in this respect, for his literary fame, if the same friendly and skilful hand [John Playfair] which has illustrated and adorned his geological researches, would undertake the task of guiding us through the puzzling, but interesting labyrinth of his metaphysical discussions.[305]

Whether Playfair considered this task is unknown, nevertheless he agreed with Ferguson and Stewart as he thought that Hutton's metaphysics "certainly merits more attention than it has yet met with…An abridgment of it, judiciously executed, so as

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[301] Geikie, *The Founders*, 166.
[302] Ibid., 167.
[303] Stewart, Dugald. *The Philosophy of the Active and Moral Powers of Man—Volume II* (1828) from *The Collected Works of Dugald Stewart—Volume VII* (1855) edited by Sir William Hamilton. Edinburgh: Thomas Constable & Co., 1855. 175. n1.
[304] Stewart, Dugald. *Philosophical Essays* (1810) from *The Collected Works of Dugald Stewart—Volume V* (1855) edited by Sir William Hamilton. Edinburgh: Thomas Constable & Co., 1855. 96.
[305] Ibid., 96-97.

to state the argument in a manner both perspicuous and concise, would, I am persuaded, make a valuable addition to metaphysical science."[306] However, even Playfair's work on Hutton's geology did not stay true to Hutton's intention and so a popularized account by Playfair of Hutton's metaphysics would most likely have also strayed from what Hutton was intending his readers to grasp.

One scathing attack on Hutton's writing style was made by Samuel Taylor Coleridge (1772-1834) who inscribed in his copy of *Principles of Knowledge*:

> 'I can not walk with them, because I could walk in them', said a wag of a very too large pair of shoes. Something of the sort might be applied to this work…In short, there is sense, and strong sense; but it loses itself in its enormous House, in the wilderness of the multitudinous chambers and passages—As poor Sarah Stoddart (afterwards, poor Lass! Mrs Hazlitt) complained to me of her Brother's Lectures and Remonstrances; 'He drives it in, and in, and in (to my head) till he drives it out, out, and out again. I feel as if there was a hole thro' my head and nothing remaining but a Buz.'[307]

Yet while Coleridge's criticism of Hutton's composition was stinging he did give Hutton's philosophical abilities great praise as he thought that in *Principles of Knowledge*,

> There is a great metaphysical talent displayed in it; and the writer had made an important step beyond Locke, Berkeley and Hartley—and was clearly on the precincts of the Critical Philosophy—with which and the previous Treatises of Kant he appears to have had no acquaintance.[308]

However, in terms of comparing Hutton and Kant,

> Hutton's interest is not so much in how the trick is done as in where the generally received views (e.g. Newtonian physics) have gone wrong and what can be done to revise them. Thus with regard to perception, which both men understand to be a process of interpreting sensations in the light of concepts, it barely interests Hutton that *a priori* material is introduced

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[306] Playfair, 'Biographical Account', 84-85.
[307] Coleridge, Samuel Taylor. MS notes in his copy of *An Investigation of the Principles of Knowledge, and of the Progress of Reason, from Sense to Science and Philosophy* by James Hutton. Edinburgh: A. Strahan, and T. Cadell, London, 1794. This copy is held in the British Library. [Underlines are by Coleridge]
[308] Ibid.

> in this process and the nomena placed beyond discovery. It is enough for Hutton that the process is 'simple' and nearly infallible, that the results are vouchsafed by God. The process itself cannot be the source of error, though the failure to recognise that the process takes place accounts for the confusions of Locke and the scepticism of Hume.[309]

So in spite of his confusing composition, Hutton was still considered to possess enormous ability as a philosopher.

In spite of *Principles of Knowledge* being Hutton's longest work and containing the method upon which his general system was built it has largely been ignored. Hutton's geology has often been treated in isolation thus not taking into account what he had to say about the principles that he applied to it. But it is difficult to understand Hutton's scientific method unless his metaphysics is taken into consideration. And by ignoring his theory of language which is embedded within his metaphysics it is impossible to attain a complete understanding of Hutton. Indeed, without a proper means of communication there would be no science so in relation to all the other sciences language "may be considered as their handmaid."[310] Therefore, a corrupt language meant a corrupt science and so Hutton was determined to establish proper first principles of language so that they would be as certain as the "elements of geometry."[311]

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[309] Galbraith, *James Hutton*, 111.
[310] PK I, 37-38.
[311] PK II, 661.

Part II—Language

Chapter Two—The Exposure of Hutton's Work on Language at the Royal Society of Edinburgh

The earliest account of Hutton's work on language was the reading of his *Dissertation on Written Language as a Sign of Speech* at the Literary Class of the Royal Society of Edinburgh in 1786. Hutton was an enthusiastic member of the Royal Society of Edinburgh and he was active in both the Physical and the Literary Class as well as holding positions as an Office-Bearer. It has been thought that "From the beginning the Literary Class lacked any great ongoing theme or themes."[312] However, this chapter will take a contrary position by illustrating how language was a theme which engaged a number of significant literati at the Literary Class during the early years of the Royal Society of Edinburgh, and show how within this philological discussion Hutton presented his paper as an appeal to the literati to reform language.

Being financially independent and with no family or professional responsibilities, once Hutton moved back to Edinburgh in 1767 he was able to focus completely on his studies as well as his activities amongst the literati. He became a member of the Philosophical Society in 1768 and "he read several papers" in that society during the period of 1771 until 1783.[313] These included "Observations on the Theories of artillery"[314] [which was never published] and an "Account of some remarkable appearances on Arthur's Seat"[315] in June 1778, which was later published in 1790 as *On certain Natural Appearances of the Ground on the Hill of Arthur's*

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[312] Campbell, Neil, and R. Martin S. Smellie. *The Royal Society of Edinburgh (1783-1983): The First Two Hundred Years.* (Edinburgh: The Royal Society of Edinburgh, 1983) 9.
[313] Playfair, 'Biographical Account', 50.
[314] *Minutes of the General Meetings of the Royal Society of Edinburgh from its Institution (June 23 1783, to July 6 1791).* MS, National Library of Scotland, Acc. 10000, Item 1, 32.
[315] Ibid.

Seat.[316] But a flurry of activity by Hutton in the mid-1780s was a result of his enthusiasm for the newly formed Royal Society of Edinburgh. He read "A dissertation on the condensation of aqiuous vapours, and a Theory of Rain"[317] at the Physical Class on 2 February and 12 April, 1784 which was later published as *Theory of Rain* in the first volume of the *Transactions of the Royal Society of Edinburgh* in 1788.[318] And in 1785 Joseph Black read the first part of "Examination of the System of the habitable Earth" on 7 March; with Hutton reading the second part and its abstract on 4 April and 4 July.[319] This is Hutton's most famous work and it was published in the *Transactions* in 1788.[320] While these activities confirm what Playfair noted about Hutton's enthusiasm for the Royal Society of Edinburgh, his activities weren't confined to reading papers as he was also an active Office-Bearer of the Society, first as one of the six Counsellors of the Physical Class from 1783 until 1790, and then as the President of the Physical Class from 1790 until his death in 1797. During the year that he presented his work on language at the Literary Class in 1786, he attended at least four out of a possible eight Physical Class meetings at three of which he was President pro Tempore, and at the Literary Class he attended at least five out of a possible eight meetings reading his paper at three of those and his abstract at another. Therefore, it would seem that he was more active in the Literary Class that year than he was in the Physical Class.

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[316] *Transactions of the Royal Society of Edinburgh*, Volume II (Edinburgh: Royal Society of Edinburgh, 1790) 10.
[317] Ibid., 32.
[318] *Transactions*, Volume I (1788) 49.
[319] *Minute book of the Physical Class [of the Royal Society of Edinburgh] November 1783-June 1793.* MS, National Library of Scotland, Acc. 10000, Item 2, 21-22.
[320] Hutton, James. "Theory of the Earth; or an investigation of the laws observable in the composition, dissolution, and restoration of land upon the globe" in *Transactions of the Royal Society of Edinburgh*, Volume II (Edinburgh: Royal Society of Edinburgh, 1788) 209-304.

The meetings of the Royal Society of Edinburgh during Hutton's lifetime were held in the College Library of "the 1617 building on the north side of the University property which had been refurbished to accommodate the library in 1753."[321] The meetings of the Literary Class were held in the College Library "on the third Mondays of January, February, March, April, June, July, November, and December, at Six o'Clock in the Evening."[322]

It is impossible to know what the meetings of the Royal Society of Edinburgh were like as the Minute-Books as well as the *Transactions of the Royal Society of Edinburgh* only provide minimal information such as the date of meetings, the titles of the papers, the names of Fellows proposing new members and who they were proposing, as well as who was the presiding officer. There is no record of what was discussed about the papers read, who was in attendance, or how many were at each meeting so it is impossible to have a complete portrayal of the audience. However it is known that there were fifteen at the very first meeting of the Society and that a quorum of twenty-one was required at General Meetings. A number of meetings were adjourned however due to a lack of attendance but an "informed guess of the audience for normal Physical Class meetings would be about 20 and, possibly, as large as 50 during the most exciting phase of the geological debate."[323] And although no attendance rolls were kept, some of those in attendance when Hutton read his papers are included in the entries of the Minute Books.

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[321] Waterston, Charles D. *The Home of the Royal Society of Edinburgh* from <http://www.royalsoced.org.uk/archives/homes.pdf> [accessed 17 October 2007]

[322] *Minutes of the General Meetings*, 9.
In the first volume of the *Transactions* the time of meeting was noted "at 7 o'clock afternoon." [13.]

[323] Shapin, Steven Arthur. *The Royal Society of Edinburgh: A Study of the Social Context of Hanoverian Science.* University of Pennsylvania, PhD, 1971. 269.

On election to the Royal Society of Edinburgh each Fellow was required to point out whether he wished to become a member of the Physical Class or the Literary Class but this did not prevent him from participating in the activities of the other Class. Indeed, there were regular examples of cross discipline work including Sir James Hall's *On the Origin and Principles of Gothic Architecture* as well as Dr. James Gregory's *The Theory of the Moods of Verbs*.[324] Hutton, as with Hall and Gregory, was a member of the Physical Class but of course it was in the Literary Class that he presented his work on language as part of an ongoing philological discussion.

The Literary Class held what is described in the Minute Book as "Enquiries relating to Antiquities, Philology and Literature."[325] In the first volume of the *Transactions* History and Speculative Philosophy were also included as being within the department of the Literary Class.[326] Papers on language were commonly read at the Literary Class and at least six were read from the founding of the Royal Society of Edinburgh in 1783 until Hutton read *Dissertation on Written Language as a Sign of Speech* in 1786. These were the *Dissertation on the Theory of Inflection in Languages* by Thomas Robertson, read 23 January and 16 February 1784; *On the English Genitive* by Dr. James Anderson, read 10 April 1784 an abstract of which was published in *TRSE* I, 1788, 23-24; *A Grammatical Essay on the Nature, Import and Effect of certain Conjunctions* by Professor John Hunter of St. Andrews, read by Andrew Dalzel 21 June 1784, and published in *TRSE* I, 1788, 113-134; *Certain Analogies observed by the Greeks in the use of their letters* by Andrew Dalzel, read 19 December 1785 and 19 November 1787, published in *TRSE* II, 1790, 111-153; as

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[324] *Transactions*, Volume II (1790), 193-250. [Paper read 18 June and 16 July, 1787]
[325] *Minutes of the General Meetings*, 8.
[326] *Transactions*, Volume I (1788), 12.

well as *The Subjunctive Mode in English Verbs* by Thomas Robertson, read by Andrew Dalzel on 18 April, 1785 and 17 December 1787. And in the months leading up to when Hutton read his paper, Professor John Young of the University of Glasgow read *Essay on the Middle Voice of the Greek Verb* on 20 February, 20 March and 17 April 1786. So Hutton was by no means the first to read on the subject of language at the Society. Nor was he the last. In fact from Hutton's paper in 1786 until the end of the decade at least four more papers on language were read at the Literary Class. These were John Hill's *An Essay upon the Utility of Defining Synonymous Terms in all languages; with Illustrations by Examples from the Latin* which was read on 18 February and 15 December 1788, published in *TRSE* III, 1794, 93-130; Dr. James Gregory's *The Theory of the Moods of Verbs* read on 18 June and 16 July, 1787, published in *TRSE* II, 1790, 193-250; Dr. James Anderson's *Observations on the Personal Pronouns* read on 15 June, 1789; and *The Latin Compound Perfect Tense* by Professor John Hunter of St. Andrews, read by Andrew Dalzel on 15 February, 1790. Therefore, during the early years of the Royal Society of Edinburgh a linguistic theme was evident in the Literary Class and Hutton contributed to this philological discussion in 1786.

The minutes of the Royal Society of Edinburgh reveal that it was customary for members to announce the title of their papers at the meeting prior to the first reading and to read an abstract of the paper the meeting after the last reading (some papers were read over more than one meeting—in Hutton's case his paper on language was read over three meetings). It was at the twenty-first meeting of the Literary Class of the Royal Society of Edinburgh on Monday 17 April, 1786 that "An Essay was announced for next meeting to be read by Dr. Hutton, intituled (sic) On

the Nature of Written Language as a Sign of Speech."[327] On Monday 19 June, 1786 at the twenty-second meeting of the Literary Class the Presidents were all absent and Dr. Adam Smith took the Chair. "Dr. Hutton read a part of a Dissertation on the nature of Written Language as a Sign of Speech; and engaged to read the remainder at the next meeting." Afterwards a "short conversation took place on the subject of Dr. Hutton's paper."[328] Other than Adam Smith, the only other member noted in attendance in the Minute Book was the secretary Alexander Fraser Tytler, however this does not necessarily confirm Tytler's presence at this particular meeting as at times some entries were entered by the secretary on a later date than the actual meetings. Smith however would have been interested in what Hutton had written about language as he had earlier published *Considerations concerning the first Formation of Languages* in *Philological Miscellany* (1761) and it was then included as an Appendix to *Theory of the Moral Sentiments* from the Third Edition of 1767 onwards, but since they were close friends Smith probably already knew about Hutton's work on language.

At the following meeting, on Monday 17 July 1786, William Robertson, Principal of the University of Edinburgh, sat as President and "Dr. Hutton read a 2nd part of his Essay on the Nature of Written Language as a Sign of Speech; and engaged to read the remainder at a subsequent meeting. The conversation on the subject of said paper was resumed."[329] The secretary's entry for this meeting was made by Andrew Dalzel, Professor of Greek at the University of Edinburgh from

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[327] *Minute book of the Literary Class [of the Royal Society of Edinburgh] November 1783-November 1808*, MS, National Library of Scotland, Acc. 10000, Item 3, 42.
[328] Ibid.
[329] Ibid., 43.

1772 until 1805, who had already presented a contribution to the philological discussion.

There is a slightly more detailed picture of who was at the twenty-fourth meeting of the Literary Class that met on Monday 20 November 1786, as "Dr. Hutton read a third and last part of his Essay on the nature of written language as a sign of speech; on which a short conversation took place."[330] The President of the meeting was Hugh Blair; and others present according to the minutes were Allan Maconochie, Alexander Fraser Tytler, Dr. James Gregory, Henry Mackenzie, Robert Henry, and Robert Walker.[331] It would have been a well-informed discussion as most of those present were to publish their own thoughts about philology. Indeed, Hugh Blair, who was Professor of Rhetoric and Belles Lettres at the University of Edinburgh from 1762 until 1781, had a great interest in language and published his highly popular overlapping works *The Rise and Progress of Language on Rhetoric and Belles Lettres* (1765) and *Lectures on Rhetoric* (1783). Dr. James Gregory's *Theory of the Moods of Verbs* was published in the second volume of the *Transactions*. And as a novelist, essayist and poet Henry Mackenzie had an abiding interest in language. Nevertheless there is no way of knowing what sort of response Hutton received at these meetings.

At the last meeting of the Literary Class for 1786, on Monday 18 December, Hugh Blair again sat as President of the Meeting at which "Dr. Hutton read an Abstract of the 3rd part of his Essay on the Nature of written language as a sign of speech." Others present were John Robison, Alexander Fraser Tytler, John Playfair,

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[330] Ibid.
[331] Ibid., 43-44.

John Hill, and John Walker.[332] So another well-informed conversation would have taken place at this final gathering of the reading of Hutton's contribution to the philological discussion as in particular John Hill was to enter the discussion two years later and publish his contribution in 1794, as well as subsequently publishing further philological works.[333] But again it is impossible to know the reaction to Hutton's linguistic work by the Edinburgh literati.

The essence of the ten-page abstract of the *Dissertation* was that Hutton believed the alphabet to have been corrupted and he thought that this was "disgraceful to a nation that is wise and learned."[334] He thought that speech should be typified in the most accurate way possible and therefore undertook an analysis of the principles of speech by first showing how articulate expression in humankind is limited by nature. Hutton examined the vocal power of man "from experience"[335] by distinguishing the various notes and modifications of the human voice in order to have a complete and universal alphabet. He methodically examined how each sound is made by illustrating the position of the vocal organ and describing how the breath is modified in the articulation of each sound. The closeness of the lips, whether or not the passage of breath is through the nose, and the use of the teeth, tongue and jaw are described in detail as to how each letter of the alphabet is produced. He went so far as to describe "the guttural or Northumbrian *r* in the vibratory modification; the Spanish *ll*" and "the French *l mouillée,* in the liquid modification" as well as "the

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[332] Ibid., 44.
[333] Hill, John. *Heads of philological lectures, intended to illustrate the Latin classicks: in respect to the antiquities of Rome; the rules of general criticism; and the principles of universal grammar*, 1792; *Synonymes of the Latin language alphabetically arranged; with critical dissertations upon the force of its prepositions, both in a simple and a compounded state*, 1804; and *Vocabulary, intended as an introduction to the study of the synonymes of the Latin language*, 1804.
[334] Hutton, James. *Dissertation on Written Language as a Sign of Speech*, read at Royal Society of Edinburgh: June 19, July 17 and November 20, 1786. Published in *Transactions of the Royal Society of Edinburgh*, Volume II, 1790 (5-15) 6.
[335] Ibid., 7.

guttural *n,* or English *ng,* in the nasal modification."[336] Once Hutton had described the various positions of the vocal organ with their separate modifications, he went on to show how among the voice articulators there is a distinction of mutes and consonants due to either the sound being produced in the windpipe or the simple drawing of breath before modification by the articulating organ. These mutes and consonants in turn can either be perfect or imperfect. This he goes on to explain in detail. Therefore, Hutton considered "every possible vowel and articulator which are proper for distinct speech" so that he could construct a universal alphabet.[337]

Having shown that in nature there are elements of speech Hutton proposed that the communication of both speech and writing should strictly adhere to this alphabet. So the art of speech and writing should progress hand in hand rather than how it was since speech was not being properly reflected in words. By pursuing any other method from "the scientific analysis of our speech, and elemental characterizing of our vocal sounds, there will then be no fixed relation between our writing and the pronunciation of our language."[338] So while there was no point changing to another orthographic system the present use of the alphabetical method needed reforming. Or as Hutton's scientific method would have stated, by 'remounting to principles.' Indeed, Hutton pointed out that the English method "is not truly" the "alphabetical method" since it has adopted the "verbal method" by representing words in which a combination of letters do not properly represent the sound.[339] However, by correcting the orthographical practice of the English language and by adhering strictly to the scientific method of the alphabet Hutton thought that this would result

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[336] Ibid., 10.
[337] Ibid., 12-13.
[338] Ibid., 14.
[339] Ibid., 13.

in two advantages. The first would mean that "the people" would obtain "great facility in learning to read and write" as once a person had learned how to write all of the sounds and articulations that the vocal organ produces in speech "within the compass of the alphabet" then it would be in their power to write what is pronounced.[340] The other advantage of adhering strictly to the scientific method of the alphabet, for Hutton, was that the language would "become uniform and steady" and "avoid corruption."[341] But having digressed from the rules of the alphabet the literary advantage that this method brought had been lost and Hutton was concerned that if the language was not returned to alphabetical principles then English could eventually descend into a logographic system like the Chinese. And Hutton believed that this inaccurate practice of orthography was a serious matter, indeed he described the "little apprehension there is in general of this error" as a dangerous "growing evil."[342] But he thought that it could be corrected straightforwardly by the "exertion of literary men" hence his reading to the literati at the Royal Society of Edinburgh.[343]

The full version of Hutton's *Dissertation on Written Language as a Sign of Speech* was not published in full in the Literary Class section of the *Transactions*; instead only an abstract version of it was published in the *History of the Society* section.[344] However, the content of the full version of the *Dissertation* was most likely identical to what Hutton would later publish as his *Principles of Orthography* eight years later in *Principles of Knowledge* which will be examined in Chapter Four. Curiously, in *Principles of Orthography* it would seem that at least part of the manuscript that Hutton sent to his printer in 1794 was exactly the same as he had

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[340] Ibid., 14.
[341] Ibid.
[342] Ibid.
[343] Ibid.
[344] Ibid., 5-15.

used when he read his *Dissertation* in 1786, because in it he mentions that he knew nothing of the vocal octave of Antoine Court de Gébelin "until a month after announcing this paper to the society"[345] despite the fact that he makes no other mention of "the society" in *Principles of Knowledge*. Another sign that the 1786 work was almost identical to the 1794 work was in the length of the work. The number of pages in the *Principles of Orthography* is similar in length to other fully published works read at the Royal Society of Edinburgh over a similar number of readings. So this further suggests that the three readings of the *Dissertation* in 1786 contained the same material that is to be found in *Principles of Orthography*. An additional point to back up this inference is that Playfair wrote that although Hutton had long been studying the theory of the earth he had also directed his attention "to the formation of a general system, both of physics and metaphysics" [346] and that before they became acquainted in about 1781 Playfair "had reason to believe" that Hutton "had completed a manuscript treatise on each of them, the same nearly that he afterwards gave to the world."[347] Therefore, Playfair believed that Hutton's metaphysics was complete at least five years before his reading of the *Dissertation*.

The decision to publish the abstract of Hutton's theory of language was probably made by Hutton and Hutton alone. While there was a definite process that papers went through before publication in the *Physical Class Section* and the *Literary Class Section* of the *Transactions*, there is no record of a procedure to decide what would be published in the *History of the Society Section*. However, Steven Shapin noted that ultimately the editing of papers for publication in the *Transactions* was "the responsibility of very few Fellows" and at least until "the turn

[345] PK, II, 675.
[346] Playfair, 'Biographical Account', 74.
[347] Ibid., 74 n.

of the nineteenth century, the major share of the work seems to have been John Robison's often assisted by John Walker and James Hutton."[348] So with the considerable influence that Hutton had in the publication process of the *Transactions* he would have decided himself only to publish an abstract of his work on language in the *History of the Society Section* rather than a full version in the *Literary Class Section.*

By reading the *Dissertation* at the Royal Society of Edinburgh Hutton was appealing to the literati as he noted that it was the "learned of the nation" that would need to make the necessary linguistic improvements.[349] But Hutton wrote that those who had the power to make the necessary changes lacked the desire, while those who would have benefited by the reforms lacked the power.[350] Nonetheless, it would seem that he thought that the remedy should have been taken by his fellow members of the Royal Society of Edinburgh as he noted that, "The first learned society, then, which should occupy itself with this useful art, would set an example of true science in the practice."[351] And this is perhaps the clearest indication yet that his 1786 paper was the same as his 1794 published version. Furthermore, the importance of the scientific utility of the alphabet for Hutton was evident in his 1794 published work, but also from the tone employed in this passage it is easy to imagine Hutton reading this to his Fellows in the Literary Class as,

> Nothing would seem more unnecessary, than the pointing out to men of science the great utility of an alphabet; and yet, it is only to men of science, that an address of this kind can be made. But, men of science do not always take a scientific view of every branch of science; and, it will not be impertinent to observe, that science may be corrupted in one

[348] Shapin, *The Royal Society of Edinburgh*, 285-286.
[349] Hutton, *Dissertation on Written Language*, 14.
[350] PK II, 731.
[351] PK II, 732.

> branch, while it is much cultivated in another. Nothing can better illustrate this proposition than the subject now considered.[352]

Nevertheless this appeal by Hutton was to fall on deaf ears.

What is worth noting at this point is that a number of works have blamed the rise in Earth Sciences [mainly as a result of Hutton's *Theory of the Earth*] for the decline in the fortunes of the Literary Class at the Royal Society of Edinburgh. Indeed, at first glance it might seem that Hutton's activities at the Literary Class, especially in 1786, helped to keep the Literary Class flourishing. However,

> The decline of the generalist nature of the RSE stems as much from the unsuitability of literary communication to the Society's format as it does from the vigor (sic) and excitement of the scientific debate....Most communications on non-scientific subjects were embedded in larger works. They did not stand by themselves as incremental contributions to an ongoing debate. The unit of literary production was the book, perhaps more so in Edinburgh than elsewhere. The second publishing city of Britain, Edinburgh made it far too attractive for a prospective author. Papers were almost always destined for separate publication and withdrawn from a society's periodical.[353]

So it can be argued that Hutton's decision not to publish the full version of his *Dissertation* in the *Literary Class Section* of the *Transactions* helped along the demise of the generalist nature of the Society perhaps more so than the publication of his *Theory of the Earth* in the *Physical Class Section* of the *Transactions*. But Hutton was not the only member of the philological discussion whose paper was 'destined' for another publication as Thomas Robertson's *Dissertation on the Theory of Inflection in Languages* formed "a detached chapter of a work composed...on the *Theory and History of Languages*, which he intends to offer to the public in a future volume of his *Enquiry into the Fine Arts*" and therefore it was mentioned in Volume I of the *Transactions* that "it was, on that account, judged improper to present it here

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[352] PK II, 715.
[353] Shapin, *The Royal Society of Edinburgh*, 233.

in a mutilated or imperfect form."[354] And another example of a paper 'destined' for a future publication was Dr James Anderson's *On the English Genitive* as he only offered "an abridgement" for publication like Hutton in "the historical part of the volume."[355] Therefore, although Hutton tested his theory at the Royal Society of Edinburgh it would seem he had no desire to have it published in full as a stand-alone piece on language and instead he only put it forward for publication within a metaphysical context eight years later. So *Principles of Orthography* was clearly integral to his metaphysics and Hutton withheld the full version for inclusion as part of *Principles of Knowledge* and thus part of his general system. Nevertheless, in spite of Hutton's decision to allow only an abstract of his *Dissertation* to be published in the *Transactions*, the fact that he read his *Dissertation* at the Royal Society of Edinburgh meant that he wanted the Edinburgh literati to be exposed to how the alphabet was corrupted and how speech and writing should progress hand in hand.

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[354] *Transactions,* Volume I, (1788), 19.

[355] *Minutes of the Proceedings of the RSE, June 1783 - July 1791.* Entry 21. December 13, 1785. (p.32) Papers of The Royal Society of Edinburgh: Item 1. [Acc. 10000 National Library of Scotland]

Chapter Three—Hutton's Principles of Speech

While the 1786 abstract version of Hutton's *Dissertation on Written Language as a Sign of Speech* was a sample of what he would later publish on written language, Hutton did not make his work on spoken language public until 1794 when it was published as *Scientific Analysis illustrated, in examining the Principles of Speech* in Section Two of Part Two of *Principles of Knowledge*. This Section is comprised of two chapters which were intended to oppose the revival of a theory of natural language by showing how language was most definitely artificial, as well as illustrating how the formation of language was a clear example of the progress of mind. However, Hutton's treatise on speech was equal to what he intended throughout his metaphysics which was to scrutinize his own science and to empirically reinforce that the universe is ordered and designed.

Hutton spent a substantial portion of his work on speech engaged in a response to his contemporaries Charles de Brosses and Antoine Court de Gébelin the *philosophes* who he believed had erroneously revived the concept that there were natural signs. In his *Traité de la formation méchanique des langues et des principes physiques de l'étymologie* (1765), Charles de Brosses had argued that it was not possible to recover the original language since it was too far in the past and it had probably "been destroyed at Babel."[356] Indeed, when he wrote of 'langues adolescentes' he did not cite any, since all languages are so distant from their origin that they have now reached 'maturité.'[357] Nevertheless de Brosses thought that language had arisen from a single source and that nature was the author of the

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[356] Juliard, Pierre. *Philosophies of Language in Eighteenth-Century France*. The Hague: Mouton, 1970. 37.

[357] Kuehner, Paul. *Theories on the Origin and Formation of Language in the Eighteenth Century in France*. University of Pennsylvania, PhD 1944. 47-48.

"germination of sound and the first true words" and even the "gradual evolution of languages towards arbitrariness does not eliminate this link."[358] And so de Brosses was opposing what Locke had established which was that words are most definitely arbitrary. De Brosses attempted to show that in addition to cries, the origin of words could also be found in

> such 'necessary words' as *papa* and *mama* which all children would automatically produce, in words associated with the particular organs of the mouth—such as *gorge, langue, dent, bouche*—in 'les mots qui peignent par onomatopée,' and in the invariable symbolic 'meanings' of particular sound combinations such as *st-* for something firm and steadfast and *fl-* for something flowing or liquid.[359]

Although these explanations lacked originality, de Brosses was the first to join them together in this context.[360] Furthermore, his originality was in the belief that language was a product of the "primary intellectual impulse to imitate."[361]

Antoine Court de Gébelin expanded on the ability to closely imitate nature in the principle of 'phonmimetism' and which Edward Nye describes as

> a sixth sense which allows us to reproduce synaesthetically our perception of the outside world in the sound of language. What is so seductive about his idea of sound symbolism is that 'nature' is perfectly reproduced in a universally comprehensible manner through the application of subjective faculties of sensory perception.[362]

De Gébelin published the enormous nine-volumes of *Le monde primitive analysé et comparé avec le monde moderne* between 1773 and 1782. His work on language later appeared in a summary of Vols. II and III under the title *Histoire naturelle de la parole, ou Précis de l'Origine du Langage & de la Grammaire Universelle* ("Natural

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[358] Haßler, G. "Charles de Brosses (1709-1777)" in *The Encyclopedia of Language and Linguistics* (second edition) Volume 2, ed. Keith Brown. Oxford: Elsevier Ltd., 2006. 134-135.
[359] Aarsleff, Hans. *The Study of Language in England, 1780-1860.* Princeton, New Jersey: Princeton University Press, 1967. 34-35.
[360] Ibid., 35.
[361] Nye, Edward. *Literary and Linguistic Theories in Eighteenth-Century France.* Oxford: Clarendon Press, 2000. 134.
[362] Ibid., 146.

history of the Word, or a sketch of the origins of language and of universal grammar") in 1776. Although de Gébelin gave man a part in the creation of language through imitation, he qualified his belief within the Biblical tradition by putting forward that God had given man his vocal organs. However, as with de Brosses, de Gébelin believed that there had been one original language and that imitation was the determining factor in shaping this first language. Sounds were then articulated to imitate nature and were used simultaneously with gesture.[363] And as Sophia Rosenfeld observed, throughout the 1770s he attempted to "rediscover and to catalogue the original, universal mother tongue, the collection of radical sounds and images that he took to be given by and representative of nature."[364] Although both de Brosses and de Gébelin believed that man's first language was a 'langage naturel'; de Brosses denied that the mother language could ever be found, but de Gébelin in a Celtic-nationalist hypothesis put forward that Gaelic was the original language.

Although Hutton wrote that he was "ashamed to protract a dispute of so little importance"[365] by focusing a substantial portion of his work on spoken language in a response to de Brosses and de Gébelin; he clearly saw their revival of nativism as a threat to the conventionalism which was the widely-accepted position on nomination. Despite mixed contemporary critical reaction to de Gébelin's nine-volume encyclopedia in which his etymological dictionary of French appeared, it nonetheless "had a successful publishing record, and subscribers included Diderot, Batteux de Brosses, d'Holbach, Turgot, Naigeon, Montesquieu, Senancour, Vigny and also Benjamin Franklin who sent Gébelin information on American languages in

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[363] Juliard, *Philosophies of Language*, 35-38.
[364] Rosenfeld, Sophia. *A Revolution in Language: The Problem of Signs in Eighteenth-Century France*. Stanford, California: Stanford University Press, 2001. 113.
[365] PK I, 612.

1781."[366] Even more influential was Charles de Brosses as the Président de l'Académie des Lettres de Dijon where a debate on language was taking place and in which Rousseau was a prize-winner. In June 1751 de Brosses read his 'Mémoires sur la matière étmologique' at the Académie de Inscriptions et Belles-Lettres in Paris from which Diderot extracted four articles: 'Langues,' 'Lettres,' 'Métaphore,' and 'Onomatopée,' and published them in the *Encyclopédie*. Inspired by de Brosses' work, Turgot wrote the article 'Etymologie' for the *Encyclopédie* and then Nicolas Beauzée wrote the article 'Interjection' also for the *Encyclopédie*. And in *Traité de la formation méchanique des langues et des principes physiques de l'étymologie* (1765) de Brosses included the material from his 'Mémoires'[367], and subsequently numerous articles appearing after 1765 in the *Encyclopédie* "quoted the *Traité* at great length."[368] Hutton would have known how influential de Brosses and de Gébelin had been on some of their fellow *philosophes* and he clearly felt the need to respond and to defend the conventionalist position.

Hutton responded to de Brosses and de Gébelin by attacking their theories of natural signs as well as the discipline of etymology as an invalid approach to the study of language. According to Hutton, de Brosses had concluded that there are "in things, natural signs for the expression of those objects in the speech of man."[369] However, Hutton's response was to point out that, for example in the case of *cuckoo* the "note of the bird is only the accidental cause"[370] in relation to speech, but it is "not however necessary" as it may be named "by another name."[371] The

366 Nye, *Literary and Linguistic*, 140.
367 Kuehner, *Theories on the Origin*, 35-36.
368 Aarsleff, *The Study of Language*, n. 44. 36.
369 PK I, 602.
370 PK I, 600.
371 PK I, 601.

methodology of de Brosses was to engage in exhaustive etymological studies in order to find the 'germ' of a word[372], and he produced a phonetic theory linking words from different languages to their 'organic root.'[373] The pivot of de Brosses' theory was "the mechanical structure of the vocal organs"[374] and the fact that this imposed a physical restriction on the number of possible sounds that can be expressed. Although Hutton likewise thought that the sounds that could be produced by the vocal organs were limited and he founded his phonetic theory upon this basis in his work on written language; on the other hand de Brosses' search for the 'germs' of words went to extraordinary lengths "in order to justify linguistic imitation, and one can only assume that the contemporary debate required a systematic treatment such as his."[375] For in the formation of words, 'germs' which could only be arranged in combinations that were restricted by nature would be used to imitate the sound of an object but in addition to this the vocal organs would have to produce a sound resembling the object, for example a hollow sound would represent a hollow object.[376] But to this Hutton replied that,

> We must not therefore allow ourselves to entertain false principles in our philosophy, in order to make etymology appear important. Just etymology will be pursued with greater success by acknowledging that names are purely arbitrary, or belong properly to the mind of man; at the same time, there are some occasions in which we are led to perceive the motive, which had actuated man in giving a proper name; and here etymology would find in things some principle, no doubt, if it had a valuable purpose. But, if it is more necessary to know what is meant by words actually employed, than what had been the invention of the word, the science of etymology, though not altogether destitute of rule, will of all others appear to be least interesting to mankind, as well as the most uncertain in its principles.[377]

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[372] Juliard, *Philosophies of Language*, 31.
[373] Haßler, "Charles de Brosses", 134-135.
[374] Kuehner, *Theories on the Origin*, 36.
[375] Nye, *Literary and Linguistic*, 138.
[376] Juliard, *Philosophies of Language*, 31-32.
[377] PK I, 604.

And while Hutton saw the value of etymology in attempting to trace the history of humankind through deriving one language from another, he considered the attempt to derive languages from a "*natural* motive" completely useless since the proof that nomination is arbitrary is in the inconsistency of languages. Indeed, of the arbitrary nature of nomination Hutton believed

> That man must have a motive, by which he is determined to give a name when he first expresses a thought, is certain: Without this, it would not be the speech of man. Man, also, must in similar circumstances be determined by similar motives. Consequently, in the speech invented by different men, there may be some affinity, so far as the motives of their nomination were alike. But, the examples of this will be extremely rare; and, nothing can so much evince this truth, that the speech of man is merely artificial, than the discrepancy which is found in the languages of men, notwithstanding the few principles on which language in general depends. How useless, therefore, the attempt to derive the various languages of mankind from its *natural* motive![378]

Hutton then put forward that since "M. le President de Brosses and I" have "reasoned *a priori* upon the subject" resulting in different conclusions, then in order to decide the question it was now time to "appeal to experience or matter of fact."[379] The evidence that Hutton put forward was that examples of onomatopoeia are rare since "excepting those animals, like cuckoo, and cri-cri, which are named from a sort of articulate cry, or those sounds which are imitated in speech, it requires great ingenuity to find out this agreement which we look for between the object and the expression."[380] He then extended his response towards de Gébelin who, Hutton noted, had carried de Brosses' ideas "in relation to this subject of natural ideas, much farther still."[381] De Gébelin, Hutton wrote,

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[378] PK I, 601.
[379] PK I, 605.
[380] PK I, 606.
[381] Ibid.

> pretends to have discovered, that the vocal sounds are those which nature has appointed to express the objects of sensation, and the consonants those of intellect. There is no question here with regard to the ingenuity of such discoveries; we are only concerned in examining how far they may appear to be true.[382]

And again Hutton pointed out that there is no natural connection between words and ideas nor could one be found in examining language etymologically.

In contrast to Antoine Court de Gébelin and Charles de Brosses, James Hutton believed in the polygenesis of language. Human nature Hutton thought is so far beyond the instinctive reasoning of the brute "who *forms* no art, and who is *taught* immediately by nature" that the expression of language is "purely in art"[383] and subsequently the operation of man's art is that man teaches man. Regarding nature providing a perfect language, Hutton believed that would mean that it had been corrupted. It is only by allowing that nature is the cause of everything including art, that nature played a part in the production of human speech. Indeed,

> nature had no part in the formation of speech; unless by that term shall be meant human nature, by which assuredly speech is made. The giving to language an original in nature, which original is afterwards to be modified and enlarged by art, is a theory that never can be proved; and, if it could, it would not be perhaps more useful; for, it truly teaches nothing.[384]

Instead, of natural signs Hutton thought that,

> nature has widely contrived man for the production of his proper language, by enduing him with the capacity of forming to himself resemblances of things which do not actually resemble, of conceiving similarities where things are truly not similar, and of knowing with certainty the dissimilarity, the inequality, of things which are perceived. Now this is science, the creator of articulate speech; this is human art, the inventor of a language; and this is that intellect which man arrives at by means of those imagined similarities and equalities, which do not exist in nature, but which are necessarily imagined in the mind of man.[385]

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[382] Ibid.
[383] PK I, 591.
[384] PK I, 609.
[385] PK I, 614.

So nomination for Hutton was clearly arbitrary and there can be "no other origin for rational language, or articulate speech" other than "man, with conscious ideas, appropriating words to express those thoughts."[386] But of course while nomination is arbitrary in its origin as soon as a name "is chosen or received, the use of that name is no longer arbitrary, so far as the word must be strictly employed to express the idea, and no other" although variations of the primary are expressed through declension.[387]

A further illustration made by Hutton was that the arbitrariness of nomination is a matter that the literati find difficult when faced with having to name a new concept. This difficulty arises from the consciousness that there is no natural connection between the concept and its nomination; and while there is a desire to find a name "that is sanctified by some former application, or associated with its sense by some sort of analogy", there also exists the knowledge "that any name is equally applicable to the subject."[388] An example of this was Locke's adoption of the word *idea* as he

> might have used many different words, such as phantasm, notion, species; but, for fear that his readers might have attributed to these words other conventional senses than what was implied in his definition, he had recourse to the expression of a Greek author, whom it is possible he might not very well understand; and, having adopted the word *idea*, this has been received by the learned, and even by the vulgar. If, instead of idea, he had taken the word *bibu*, the very same purpose would have been served; but, he could not then have introduced it under the authority of Plato.[389]

However, while Hutton believed that he had escaped this misdeed by using existing words with what he thought were proper definitions, his critics did not agree.

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[386] PK I, 608.
[387] PK I, 635.
[388] PK I, 606.
[389] PK I, 607.

Indeed, an example of this was his use of 'science' that is evident in his explanation of artificial language.

In *Principles of Speech* the purpose of Chapter I—*Nature of Speech as the Sign of Thought*—was to "consider the general design of man, in forming speech"[390] and Hutton's method was to differentiate between animals and humans to show that while brutes are not prevented from speech due to the lack of vocal apparatus, only humans are designed for language. Hutton believed that 'reason' was an instinctive faculty and an example of this in language was how an animal can recognise its name. Although both man and brute possess "sensation, perception, memory and reason", the decisive difference between humans and animals was that brutes do not possess "any degree of that which is properly termed science."[391] As explained earlier in Chapter One Hutton defined 'science' as the ability to analyse, or "Knowing by reflection."[392] Indeed, Hutton noted that although both humans and brutes have the vocal apparatus for producing speech, only humans distinguish the relation of things and thoughts, and with this general faculty they forms signs for their thoughts.[393] In this regard he followed the view of abstraction that Locke had expressed in his *Essay* as "*beasts*" cannot "compound and enlarge their ideas" since the "power of *abstracting* is not at all in them", furthermore the "perfect distinction betwixt man and brutes" is that animals do not possess general ideas and therefore cannot make general signs for universal ideas.[394] But Hutton was critical of the way that 'reason' and 'science' had been defined elsewhere as

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[390] PK I, 576.
[391] PK I, 579.
[392] PK I, 30.
[393] PK I, 588.
[394] Locke, John. *An Essay concerning Human Understanding* (1690) edited by Roger Woolhouse (5th edition, 1706) London: Penguin Books, 2004. Book II, Chapter XI, Section 10. 156.

> People who have only superficially examined the nature of their knowledge, are apt to fall into a double deception; first, in undervaluing the human faculty of science, by which man aspires to the divine attribute of universal knowledge; and secondly, in overrating reason, which as an instinctive operation of the animal is perfect, but is not always productive of that species of knowledge which is properly scientific.[395]

Therefore, Hutton's definition of 'science' was what he thought was the determining factor in how humans were designed for speech. And of course for Hutton this design was made by a benevolent deity that had "intended man as the contriver of his proper speech" in order to progress towards the final cause of human happiness.[396]

Hutton defined spoken language as the "regular adapting of modified or articulate sounds to distinguished ideas or conscious thoughts."[397] These sounds are systematic and they represent thought conveyed by speech put forward to the mind of the listener. And thoughts that have already been put forward in speech suggest the sounds that are associated with these thoughts so that there is a conscious association between the mind's ideas and the vocal powers. The articulate sounds that are produced in the "intellectual operation of a voluntary agent" are therefore the expressions of man's art.[398] Indeed, speech is simply a matter of man communicating upon a voluntary operation as "the moment that he desires either to communicate his knowledge to another person, or to know what that other person thinks, he proceeds to form a sign for thought."[399] Consequently language is artificial as it requires 'science' for its formation since thoughts cannot be expressed without distinguishing knowledge through reflection.

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[395] PK I, 580.
[396] PK I, 589.
[397] PK I, 576.
[398] PK I, 577.
[399] PK I, 598.

As an illustration of how language is only natural to humans Hutton showed how a child's grammatical error, for example in uttering "*many sheeps*" is proof of the scientific nature of humankind in comparison to, for example Sir William Temple's Brazilian parrot which would not have had the power of ordering.[400] Indeed, the ridiculous story of a rational parrot, which had been recounted by John Locke[401] leaving himself open to undeserved criticism[402] beginning in the 4th edition (1700) of *An Essay concerning Human Understanding*[403], was used by Hutton to show that animals were precluded from language in spite of their vocal abilities. The tale had been told to John Locke by Sir William Temple having himself heard it from Prince Maurice (Dutch colonial governor, Johan Maurits of Nassau-Siegen) who had spoken to the so-called rational Brazilian parrot in Dutch through a Brazilian interpreter the conversation of which was recorded in French! However, Hutton pointed out that although some sagacious animals are well-adapted for speech in the form of imitation, that to believe an animal such as the Brazilian parrot could hold rational discourse would require a faith in miracles equivalent to the belief "that a tree could walk."[404] Still Hutton noted that imitation does in one manner have a part to play in the development of human language. As with Sir William Temple's rational parrot children are taught to imitate sounds despite having no knowledge of the ideas connected to the sounds. However, children in contrast to animals gradually gain knowledge of the connected ideas due to their capacity for reflection.

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[400] PK I, 595.
[401] Locke, *An Essay*, Book II, Chapter XXVII, Section 8. 300-302.
[402] Walmsley, Peter. "Prince Maurice's Rational Parrot: Civil Discourse in Locke's Essay" in *Eighteenth-Century Studies*, Vol. 28, No. 4. (Summer, 1995), 413-425.
[403] Locke, John. *An Essay concerning Human Understanding* (1690) collated and annotated with prolegomena, biographical, critical and historical by Alexander Campbell Fraser. Oxford: Clarendon Press, 1894. Volume I, 446.
[404] PK I, 581.

Hutton did not follow in the footsteps of Mandeville, Condillac, Rousseau and Smith who had constructed 'conjectural or theoretical' histories which featured accounts of savages uttering the first passionate sounds of humankind. Nor did he choose to discuss whether or not society preceded language. The break from rationalism via Locke's *Essay* demanded that an investigation into the origin of language would take place and by the late eighteenth century it was clear that language had developed over a considerable period of time as the sensationalists had to find an explanation for the origin of language in man's experience. But as with his geology Hutton avoided hypothetical speculations or conjectural timescales, and of the difficulty in tracing the beginning of language he wrote that "for us, who have received our language modified though such a series of improving nations, it is not an easy matter, to investigate the natural progress of this intellectual operation; although it be abundantly clear, that it must have had a beginning which was much more simple."[405] Instead of constructing a conjectural history of language he focused on the interdependence of an individual mind and language in its formation and progress, but also acknowledging of course that communication takes place between at least two individual minds. Nevertheless, Hutton's focus was "with respect to an individual mind" and how thought must be the "mean employed in the producing of language."[406] So he noted that while language is "a system of thoughts and a system of sounds properly adapted to each other"[407] one of them must have preceded the other and of course for Hutton that one was thought.

Hutton was therefore interested in the origin of language principally in relation to the progress of the mind and at what point in the progress of mind

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[405] PK I, 619.
[406] PK I, 616.
[407] Ibid.

artificial language began. He identified that along with an animal's ability to recognise its name humans can make sounds without them being signs and collectively he referred to this as 'instinctive language'. So for Hutton to find the moment at which point language began he had to draw a "distinction between the instinctive and the artificial speech of man" that was

> When we suppose man having thoughts to be expressed, that is, conscious thoughts; and when we suppose man a thinking being capable of understanding thoughts by means of signs, we can have no difficulty in seeing how language must begin. Not because there is any necessary connection between the thought and any particular expression of that thought in language; but, because every effort of man, to express to another what he feels himself, would, in that state of man, serve the purpose of the intention. He could not, on this occasion, utter a sound which would not have a signification; and, this connection of things would be recorded, in the mind of him who understood the occasional expression. Here, artificial language is begun; and, it is proper language, however imperfect for the end of science, or however little progress may have been made in this attempt; because, this first step is infinitely more than all that may be afterwards performed, in pursuing this design.[408]

Furthermore, in appropriating a sign to a species, there "must be science in the thought" and this

> must be done, before one step is made in forming language; but, having made the first step, all the rest are easy: He that makes a ladder of only one step, requires no more inventive powers, to make one which should reach the moon, were his physical powers equal to his intellect.[409]

Therefore, once artificial language has begun it then progresses as does mind.

After the formation of language there is a mutual progress of science and language, since "Without language, how could science grow by means of the intercourse of men? and, Without science, how could language be produced?"[410] This was in stark contrast to Hobbes who had earlier written that it is "once we come to a knowledge" of all the "consequences of names appertaining to the subject in

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[408] PK I, 600.
[409] PK I, 599.
[410] PK I, 577.

hand" that we reach what "men call SCIENCE."[411] Indeed, Hutton referred to Thomas Hobbes' "opinion" whereby "language is in man the cause of science, and not science the cause of language."[412] Although he thought it was "natural" for "Mr Hob's (sic)" to form "such an opinion, when a person limits his views to the effect of language upon science; and when he does not analise (sic) science, so as to see in it the cause of language."[413] So this was another example of Hutton announcing that he had accurately identified the order of the progress of mind.

Just as Hutton had shown that 'science' [as the analytical stage in the progress of mind] and language progressed together in the individual; he also noted how a mutual progress took place between 'science' [as a large body of knowledge] and language in the human species. Indeed, "science and language always keep pace or some proportion in a state or people."[414] At this point Hutton chose not to engage in stadialism, theories such as those representing a number of stages of human development that were typical of some of his fellow literati; however he did later put forward that in spite of its flaws English was the most advanced of languages. Nevertheless, during the mutual progress of science and language error creeps into both, and so Hutton's method of 'remounting to principles' had to also be applied to language and its improvement.

In order to communicate accurately, Hutton noted that language is much more than the multiplication of signs, but requires judgement, modification and understanding to analytically process the knowledge of signs as well as synthetically

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[411] Hobbes, Thomas. *Leviathan, or The Matter, Form, and Power of a Commonwealth Ecclesiastical and Civil.* (1651) From "The Collected Works of Thomas Hobbes" Collected and Edited by Sir William Molesworth, Volume III. London: Routledge/Thoemmes Press, 1994. 35.
[412] PK I, 577.
[413] PK I, 578.
[414] PK I, 577.

producing an arrangement of ideas in sound in a similar order to the actual knowledge within the mind. Indeed, it was also Hutton's intention that his work on spoken language was to be an illustration that the progress of mind "is so well exhibited in the formation of language."[415] So man is taught to speak and to think through language and even if a listener is unaware of an abstract term that is being communicated to him, provided he understands the other speech referring to the abstracted idea he can then form the distinction of the idea. However, in acquiring knowledge by means of speech this must be done in steps,

> That is to say, the whole intellect of man consists in a progress from one operation to another; and, it is impossible to go from the first to the last, without passing through those which, in the natural order of knowledge, are intermediate; in like manner as, one cannot step from the bottom to the top of a ladder, except by the degrees.[416]

As a result, this progress of knowledge that is expressed in speech is a procedure that forms steps by reflecting on what is known and "on which he is again to stand, and from thence to proceed still higher in his knowledge."[417] Consequently language and knowledge progress axiomatically and just as "language is in man, and not in nature"[418], the mind of man "forms axioms; but, nature, without forming any axiom, forms the mind of man."[419] So while 'science' is part of man's constitution, humankind nevertheless had to axiomatically invent language. Therefore, Hutton's geometric reasoning was evident in his theory of spoken language.

Hutton had shown in the first chapter of *Principles of Speech* "that science is required, in order to form any language"; but in the second chapter—*Of the*

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[415] PK I, 574.
[416] PK I, 631.
[417] PK I, 620.
[418] PK I, 589.
[419] PK I, 590.

Constituent Parts in Speech—he focused on "how much science is required to form a proper language."[420] In this examination Hutton proceeded through the "different orders of knowledge"[421] which are attained in the progress of our mind and its expression in speech, thus *Of the Constituent Parts in Speech* examined "the constitution of speech."[422] To show how much science is required to form a proper language, Hutton proceeded to explain the progress of the mind in showing how thoughts are named arbitrarily in the mind and then articulated. The three sorts of ideas to be typified in speech are: ideas or objects which are natural and do not imply relation; secondly, abstract ideas between natural ideas; and thirdly, words that reflect on knowledge including the comparing of generals in generalising abstract ideas. In other words nomination is something that occurs for all ideas whether or not this happens to be a particular "natural idea" distinguished by nouns substantive, or artificial ideas formed by the generalising of generals these ultimately all require nomination.

Knowledge to be nominated was divided into the instinctive and the intellectual part of the human constitution. The instinctive part distinguishes material objects whereas the intellectual part of our constitution is the knowledge of our knowledge or the subject of our thoughts in reflection. Hutton was interested in the method of science that is used to convert thoughts into articulate language. A total of three subjects to be nominated in this order of knowledge were divided into natural and intellectual objects. The first subject to be nominated was external objects, or material things known by sensation and perception which included four classes of nomination: [in order] "*proper names*", for example, 'the name of a dog';

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[420] PK I, 620.
[421] Ibid.
[422] PK I, 576.

"*special names*" or "the sameness between the thing which is individually named", for example, 'dog'; those which are "*generic*", for example, 'animal'; and *universals* which are generals of general things known by sensation and perception.[423] The second subject in the order of nomination was the abstract qualities of our sensation and perception (animal knowledge): [in order] "*absolute*" qualities which are comparative; "*quantity*" and "*quality*"; and "*thing*" which comprehends change or the action of things in particulars, generals and universals.[424] Although these thoughts are part of our instinctive faculties Hutton made it clear at this point that reflection upon sensation and perception is required before these thoughts can be communicated to another reflecting person. So while physical thoughts "derive their origin immediately from objects that are natural or material", when we reflect and communicate to another reflecting person the distinction perceived in our own thinking, it is this contemplation formed in "reviewing those thoughts by which" our "former actions had been conducted" that begins the thoughts which are "properly metaphysical."[425] The intellectual part of our constitution is the third subject in the order of nomination and the same method is employed as: individual thoughts are generalised, for example knowledge by the eye or ear is *sight* and *hearing*; those species are generalised "in order to form a genus or more general"[426] and are called *sensations* or *ideas* depending upon whether they are caused externally or internally; and perceptions which for example require particular names for magnitude and figure and are then generalised in "those terms of *magnitude and figure*"; then all of the

[423] PK I, 621-623.
[424] PK I, 623-624.
[425] PK I, 624-625.
[426] PK I, 625.

ideas of sensation and perception can again be generalised into *universals*.[427] It is therefore the case that whether internal or external objects are being contemplated the highly generalised process arrives at the "same universals."[428] But the intellectual part of our constitution proceeds and in distinguishing "*memory*" and "*judgment*" creates knowledge in forming opinions.[429] Opinions are then designated as being "*true* or *just*", "*false* or *erroneous*", thus leading to either agreeable or disagreeable and pleasing or displeasing thoughts.[430] This leads to the formation of a "conscious motive or principle, for the direction of our voluntary actions, and a source either of satisfaction or remorse, according as we either preserve our conscious principle, or transgress it, in our acting."[431] A conscious motive or principle amounts to an understanding of the "*universals* truth and falsehood, good and evil" which has been formed to influence our moral conduct.[432] And at this point Hutton commented on how the area of thought from sense to the moral sentiments is both extensive and complicated, and as language becomes confused through its complexity man is led "*scientifically*" to simplify it again so that there are both rules for generalised thought as well as rules within rules to express relations occurring in the "extension of complicated thought."[433]

Although ideas are articulated in sound, Hutton was most concerned about the internal nomination of ideas in successive processes of abstraction. Indeed,

> For, so far as speech is the sign of thought; and so far there is a natural progress for thought, in the constitution of the human mind which first distinguishes and then generalises its knowledge, the speech of man

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[427] PK I, 626.
[428] Ibid.
[429] Ibid.
[430] PK I, 627.
[431] Ibid.
[432] Ibid.
[433] PK I, 628.

> should consist of certain species or distinct parts, which may be again generalised, in whatever manner those specific expressions shall be signified in different languages. By thus generalising every individual expression of thought, we shall see the formation of language in general; and, this is then the science of our language. As therefore language is the creature of science, and the subject of our knowledge, so, in seeing the science of language, *i.e.* the order and disposition of those signs of thought, we shall obtain a certain view of science as the natural progress of human understanding.[434]

Therefore, the purpose of the second chapter on speech was to "show, that all composition, inflexion, conjugation, and declension of words, ought to be considered in no other view than as a regular nomination of thoughts"[435] and so *Of the Constituent Parts in Speech* did not focus on the grammatical but on the logical as he only took a 'cursory' view of the actual parts of speech.

Once Hutton had shown how nomination of thoughts occurred he then took a "cursory view" of the parts of speech.[436] Indeed, an important trait of this chapter was that rather than take a grammatical examination of the parts of speech in the manner of most of his contemporaries, Hutton's study of the parts of speech was simply in relation to the progress of the mind. In fact throughout this 'cursory' view Hutton barely mentions the actual names of the parts of speech and remained focused on the particular operation of thinking. And as with thoughts, the formation of speech is progressive and begins with words which refer to "natural objects, and imply no relation, nor generalisation."[437] Words are then contrived to imply the operation of judgment "in knowing relations, such as *black* and *white*, *hot* and *cold*."[438] And finally words are used to reveal abstract speculations reflecting on knowledge "which apply properly to abstract ideas, but also those that signify the

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[434] PK I, 629.
[435] PK I, 617.
[436] PK I, 630.
[437] PK I, 631.
[438] PK I, 632.

generalisation of those abstract terms; such as those of *more* or *less*."[439] In wondering "where begins the generalisation of our ideas?" Hutton answered that he believes it is "where the science of man begins, there also begins the generalisation of his thoughts, which are all at first particular."[440] If there were only natural particulars or nouns substantive, then in comparing these man "would reason instinctively, or without science; but, as he generalises in idea, he has the capacity of reasoning in science, of distinguishing species, and of comparing generals, in order to form ideas still more general."[441] So nomination is particular or general and in the general or species of things is required the idea of unity and number which is accomplished through "repetition, changeable termination, or by preposition."[442] Particular qualities are distinguished in nomination followed by the comparison of qualities by also distinguishing quantity, as well as space and time, action and passion. However, in remaining fixed to his intention of illustrating the formation of language in nomination of thought Hutton does not once use the term "adjective" in this particular explanation.[443] Of more complexity is conjugation, and in describing the expression of verbal inflection Hutton does infrequently refer to "verbs" and "adverbs" but is still ultimately concerned with the nomination of a type of thought. Conjugation is the most complicated point of progress for Hutton in the nomination of the actions and passions of things or "their change in relation to his ideas of space and time, of necessity and will."[444] Like the declension of nouns, the conjugation of

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[439] Ibid.
[440] Ibid.
[441] PK I, 633.
[442] PK I, 634.
[443] PK I, 638-642.
[444] PK I, 643.

verbs can be performed by either "the various termination of the primary vocable"[445] which when done distinctly "has the advantage of beauty and of force"[446], or by "the association of abstract terms" which "is most simple and most perfect, as being conform (sic) to the nature of knowledge, although not natural to the most simple state of man: It is scientific in the highest degree; and therefore, it would be last in the order of discovery."[447] In this last point Hutton had been influenced by his friend Adam Smith and he acknowledged that indeed it had been expressed earlier by "Dr Smith on the first formation of languages."[448]

Adam Smith's *Considerations concerning the first Formation of Languages* (published in *Philological Miscellany* in 1761 and then included as an Appendix to the Third Edition of *Theory of the Moral Sentiments* in 1767) essentially focused on the order in which the parts of speech evolved and the explanation behind their development. The concept that the best way of acquiring insight into the mind through language was a method that Adam Smith had earlier expressed as,

> The best method of explaining and illustrating the various powers of the human mind, the most useful parts of metaphysics, arises from an examination of the several ways of communicating our thoughts by speech, and from attention to those literary principles which contribute to persuasion and entertainment."[449]

It is important that this observation by John Millar is placed in its proper pedagogical context as being noted in relation to Smith's lectures on rhetoric and *belles-lettres*;

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[445] Ibid.
[446] Ibid.
[447] Ibid.
[448] Ibid.
[449] From John Millar's description of Smith's lectures on logic as reported in Dugald Stewart, 'Account of the Life and Writings of Adam Smith LL.D.', in Adam Smith, *Essays on Philosophical Subjects*, eds. W.P.D. Wightman and J.C. Bryce, in *Works* (1980). (269-351) 274 as cited in Hans Aarsleff's 'Philosophy of Language' in *The Cambridge History of Eighteenth-Century Philosophy* Volume I, Ed. Knud Haakonssen. Cambridge: Cambridge University Press, 2006. (451-495) 489 n.3.

while on the other hand, Hutton's 'illustrating example' essentially remained focused on the logical and how the operations of the mind were nominated.

Having shown how through the process of nomination and his 'cursory view' of the parts of speech that this equates to progress in the human mind, another reason for Hutton's illustration was surely to show how it is only the few who have progressed to philosophy and thus natural religion. Indeed, Hutton drew a distinction between those who know language and the few who can see language systematically since,

> Though science be natural to man, and language be the artificial operation of his science, yet, there is an almost infinite difference between the expressing a thought in good language acquired by human art, and the understanding of those principles of science by which that art of expressing thought had been acquired; the one is the fruits of science, operating in a conscious being trained by the species to think, and to express his thoughts; the other is the progress of a mind, arriving at extreme perfection in the talents of scientifical (sic) reflection, and then knowing those principles of science, by which the species had arrived at the art of training him in science and in language. A mind that is trained to speech, and made perfect in the art of language, is not necessarily informed with regard to the science of logic, or he may be ignorant in relation to the principles of his artificial speech and distinct expression; this science however he may attain; in which case, he would be infinitely more knowing than he had been before, when he only had the art of speech, being supposed absolutely ignorant of the science. Therefore, though this science of logic be necessary in the person who invents speech, and thus trains another mind to language, it is not necessarily in the person trained. This person, though a scientific mind, and possessing science as an art which he had learned, has not the science of that art, or the knowledge of its principles; this is a superior sphere in science, to which few of the multitude of mankind arrive, or not in any considerable degree.[450]

So those who had only rudimentary linguistic abilities might also believe that "parrots understand the language which they speak" as this is "common, or it is natural to the common people, who have not science sufficient for judging in this

[450] PK I, 614-615.

matter."[451] But while some in society might not have been as credulous as to believe in a rational parrot, they may however have been without the ability to know the order of language as represented in the parts of speech which Hutton noted are inscrutable to the common man. And as to the individual who had been taught language artificially, "this knowledge of order, or this understanding of the language, would be unobserved."[452] But those who 'understand' language in general learn it through grammar and scientifically know language by having the ability to distinguish the parts of speech.[453] Of course, an "infinite difference" exists between 'knowing' a language that is the ability to speak a language, and 'understanding' a language which is the ability to know a language by "scientific analysis" that includes the "distinctive knowledge of its several parts, their uses and relations, in the application to our distinguished ideas."[454] And an example of someone 'understanding' language would be comparing

> the Greek for example and the French, with a view to determine which of those two is the most perfect language, [this person] has certainly learned a great deal more than to speak a language; he has learned to know language in general; which is perhaps infinitely more than speaking Greek and French in the purity of those languages.[455]

So Hutton was equating the ability to see the system in language with those philosophers who can see the system in the intellectual, moral and natural systems and are thus led to natural religion.

When Hutton began his work on language his intention was to illustrate how the progress of the mind is displayed in the formation of language. However, his

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[451] PK I, 581.
[452] PK I, 628.
[453] PK I, 615-616.
[454] PK I, 596.
[455] PK I, 616.

treatise on language grew "into a complicated dissertation, which has an end or proper object of its own; namely, to exhibit the science of logic or communicating thought, in order to improve the useful art of speech and written language."[456] Improvement was necessary since Hutton had proven that language was artificial and thus imperfect. The fact that there is indefinite variety in language was the proof that Hutton gave for speech being artificial. Indeed, the evidence which Hutton offered was that

> all men do not form the same language; and, the artificial language of one man, tribe, or nation, is not naturally known to another, so as to communicate their thoughts. This art, no doubt, is natural to man; because, science is natural to him, and art naturally follows science. This is the reason, that all nations have the use of speech in language; although the specific differences, in the speech of nations, are indefinite.[457]

But another reason that Hutton gave to prove that speech was artificial was to note that if nature had provided language then it would have been perfect, continued without change, and been the same in each person. So much so that he thought that it would have "been equally difficult to corrupt a perfect language, as it is to perfect that which is so naturally imperfect."[458] Therefore, an imperfect language at least required improvement.

During the seventeenth and eighteenth centuries there were countless *a priori* schemes to construct a perfect language, but Hutton thought that these attempts were worthless. Indeed, he thought that there was no point in designing an *a priori* universal language as there can be no one-time fix for language since it is a living entity. However, since Hutton thought that language is artificial and had progressed in its complexity he nevertheless believed that it could be improved. Hutton's

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[456] PK I, 574.
[457] PK I, 597.
[458] PK I, 649.

prescriptive method for the improvement of language was mainly expressed in his work on written language. But in his work on spoken language he did note that since man's articulating and sounding powers are limited and the rules of forming language are "fixed in the nature of things" it is inevitable that there must be "one best of possible languages"; however it is not possible to form "the most perfect language"[459] as man is prejudiced towards the sounds of which he is most accustomed to articulating, as well as the words used in the environment in which he lives. Although there is no possible "perfection, and indefinite variety"[460] in language, there are rules in which language may be "perfected"[461] and because man acts from choice and learns through seeing his error, language is "at best imperfect, but is improved with his science."[462] Since the history of language was one of haphazard development and a living language thus resulted in continuous change, Hutton realised that language could not be perfected however through applying certain rules it could strive towards perfection.

Hutton's work on language was therefore also a prescription for "both for the perfect pronunciation of speech, and for the perfect representation of that spoken language."[463] The rules that Hutton put forward were that words used frequently should be formed from sounds that are easy to pronounce, whereas words used infrequently should be formed from sounds that are more difficult to pronounce. In other words, general principles exist in nature on which the expression of language should be made so that it is better articulated and more easily understood. Indeed, "If we are to consider what it is that should constitute the perfection of language, this

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[459] PK I, 646.
[460] PK I, 649.
[461] PK I, 646.
[462] PK I, 611.
[463] PK I, 576.

will appear to be –The power of expressing every thought, with the greatest facility to the speaker, and the greatest pleasure to the hearer."[464] In order to achieve this aim several requirements were put forward: the nomination of thoughts is the essential aspect of speech, and this includes "all composition, inflexion, conjugation, and declension" of words which should be "the most simple, distinct, and easy pronounced."[465] Less essential but required for perfection are the ornaments of speech, which are "the most natural or perfect order of syntax", and the music of language or the "most melodious and pathetic expression of sounds and marking of time."[466]

While Hutton thought that Rationalist attempts at constructing a perfect language were futile, he nevertheless thought that language could be improved as "though man has not knowledge sufficient to form a language *a priori*, his science is abundantly sufficient for improving it *a posteriori*."[467] Hutton believed that words from other languages that better serve the intended idea should be adopted, but as a taste of what he wrote about in regards to improving orthography he thought that these words should be phonetically accurate. An example that he gave was that in the word *amorous* the syllable *ous* should be made redundant and the word should be nominated *amor* as in the Latin. But even this method would have its problems as Hutton thought that to introduce compounds from another language would require an explanation for their arbitrary marks.[468] However, despite problems that might arise in nomination being adopted from other languages, Hutton thought that the adoption

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[464] PK I, 617.
[465] Ibid.
[466] Ibid.
[467] PK I, 647.
[468] PK I, 647-648.

of a better construction of grammar would benefit the language and thus through communications between nations a natural improvement would occur in language.[469]

Although Hutton believed that English was flawed he nonetheless thought that it was the best of languages. By making a clear distinction in having only one declension in nouns and by having the nominative case separated from the common vocable, in comparison to Latin, French and Spanish, English tends towards perfection as for example compared with "*penna*", "*a pen*" in "simplicity forms the greatest beauty in speculation, and utility in practice."[470] Hutton pointed out that English also has different ways of expressing the singular in either particularity or generality, for example "a man, and one man", and this too "arises from the greater perfection of our grammar."[471] Moreover, Hutton thought that by joining the particle *a* to the nominative in order to obtain for example *a pen*, was as "simple as the nature of things, or distinction of thoughts, can admit of; and is much more perfect than the Latin, which did not always distinguish the number without knowing the case."[472] This was also a point upon which Adam Smith had remarked in *Considerations concerning the first Formation of Languages* when he compared the Latin which had different nominatives to the English nominative *a* which he related to the simplification of machinery.

As with most eighteenth-century writers on language Hutton was also influenced to some extent by the Cartesian notion of universal grammar[473] the thesis underlying the Port-Royal *Grammar* (1660) that languages share a fundamental

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[469] PK I, 648.
[470] PK I, 637.
[471] PK I, 636.
[472] PK I, 637-638.
[473] "Descartes letter to Mersenne dated 20 November 1629 is usually taken as the first significant word on universal grammar in modern philosophy." Source: *Oeuvres de Descartes*, eds. Charles Adam and Paul Tannery (Paris, 1897), I, 76-82. as cited in Stephan K. Land 'James Beattie on Language' in *Philological Quarterly* Volume 51, 1972. (887-904) 890.

structure representing human thought. However taking into account that the objective of Hutton's work on language was first and foremost, "to exhibit the science of logic or communicating thought, in order to improve the useful art of speech and written language,"[474] then Hutton's work on language was probably also influenced by the Port-Royal *Logic* as Arnauld and Nicole had expressed that "Logic is the art of conducting reason well in knowing things, as much to instruct ourselves about them as to instruct others."[475]

Since Hutton was illustrating how the interdependence of thought and speech resulted in mutual error, he was also showing that both science and language could be improved upon in order to ascertain reliable knowledge by using proper principles. Although science is both the object and the cause of language,[476] science "is only perfect in capacity" since it is imperfect with regard to the individual as "man errs in speech, as well as in thinking."[477] A consequence of this imperfection of language, is that philosophy "suffers in the erroneous, reasoning of the man; and, man occasionally suffers in the errors of philosophy."[478] Therefore, by understanding language philosophers have a tool with which erroneous thinking can be traced through the examination of the formation and progress of language as this provides a device to see the order and progress in our thinking. Subsequently, our thinking can be retraced to first principles in order to eradicate what is false or erroneous in both thought and language. Even though language is erroneous or imperfect by its nature, "man must know error, in order to know truth", and

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[474] PK I, 574.
[475] Arnauld, Antoine and Pierre Nicole. *Logic or the Art of Thinking* (1662) translated and edited by Jill Vance Buroker. Cambridge: Cambridge University Press, 1996. (37) 23.
[476] PK I, 579.
[477] PK I, 592.
[478] Ibid.

therefore, "man errs in order to know; and, he knows in order to become wise."[479] So while the species accumulates truth through the errors of the individual and since man is "educated in society" the individual gains through the wisdom of the species.[480] Yet, as "the progress of science is committed to the wisdom of the species" this can also result in error "sometimes propagated in place of truth."[481] But since science and language are "conjoined,"[482] it is therefore by adhering to proper principles in science and language that a mutual benefit accrues resulting in greater scientific accuracy. Certainly, Hutton's metaphysics including his logic was designed to test and retest his own findings by continually remounting to first principles from philosophy having already progressed to philosophy from first principles.

Although clearly influenced by a number of his predecessors, Hutton was concerned about the accuracy of thought and language rather than many of his audience who had written about language in relation to taste, politeness, grammar, rhetoric and *belles-lettres*. While the eighteenth century saw a huge out-pouring of grammatical and rhetorical publications, Hutton's work on language including his method of improving language was primarily a work of logic designed to provide scientific accuracy. In fact although Hutton thought that the study of language was "a curious as well as useful branch of science", he noted that it was "not properly the subject of this treatise."[483] Instead, Hutton wrote that "the analysis of our language is truly that of human thought, which is the proper object of this work."[484] So Hutton's

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[479] Ibid.
[480] PK I, 593.
[481] PK I, 612.
[482] PK I, 578.
[483] PK I, 629.
[484] PK I, 616.

work on speech was essentially an examination of its place in the progress of thought as well as the progress of thought in speech. But while Hutton dealt with language first and foremost as a logician, his aim was also to show the literati how they were communicating imprecisely and how the way in which sounds are articulated can be improved so that science is understood and recorded accurately. Therefore, while Hutton's *Scientific Analysis illustrated, in examining the Principles of Speech* opposed the theory of natural signs by confirming that language was artificial as well as illustrating how the pattern in language formation was equitable to the progress of the mind, it was nevertheless distinct in that his work on speech was no different from the rest of his *Principles of Knowledge* in that he intended it to be an epistemology that remounted to principles especially to test his own physical science and to empirically show that there is order and design in the universe.

Chapter Four—Hutton's Principles of Orthography

Hutton had initially intended his work on language to illustrate the mind's progress, but it grew into a "complicated dissertation" which also included how language should be improved. So instead of presenting a "dissertation within a dissertation" he thought that it was better to place his work on written language at the end of the second volume of *Principles of Knowledge* as an Appendix to Part II, Section II: *Being A View of the Principles of Orthography, in illustration of the Theory of Scientific Analysis*.[485] In this work on orthography Hutton identified problems in the English orthography such as foreign spellings and the same sound not being connected with the same symbol. The solution for Hutton was to develop a universal alphabet and then to show how such a perfect alphabet could be applied to English. The two main advantages that he thought would result from reforming the alphabet were that there would be a more efficient way of learning to read and write, and that pronunciation would become more stable. But just as Hutton's work on spoken language was ultimately part of his process of remounting to principles in an attempt to test knowledge internally, his prescription for written language was also fundamentally part of the method of remounting to principles in an effort to achieve scientific accuracy.

Principles of Orthography was arranged in four chapters. Chapter One—*Nature of written Language as the sign of Speech* explained how the alphabet was founded on principles which had been corrupted, thus resulting in confusion and threatening scientific accuracy. The second chapter *Science of the Alphabet* sought the means to perfect the alphabet and illustrated how it was important to understand

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[485] PK I, 574.

"not only the scientific principles of speech, but the natural elements of those principles."[486] The utility of a perfected alphabet was the focus of Chapter Three—*General Reflections with regard to this Doctrine of the Alphabet*, and in the fourth chapter *Advantages arising from the Science of the Alphabet* Hutton studied the advantages of adhering to a 'perfect alphabet' as well as the disadvantages of neglecting the alphabetical rule.

Hutton thought that there was a danger that if the alphabetic rule of one symbol to one sound continued to be disregarded then eventually the English language would descend into a logographic system of writing. As an illustration of the possible dangers that might materialize if Britain did not adhere to proper orthographic principles Hutton examined the literary state of various nations throughout history, and he wrote that the circumstances of some societies had reached an advanced state of affairs in spite of not having the art of alphabetical writing. He provided the example of how the Incan empire did "honour to the human intellect" by carrying the art of government and moral principles to "high perfection", but it was not from any "defect of understanding that prevented the germinating of any literary production" depriving us of the history of the Incans.[487] Instead it was from

> the want of a dozen or two of letters, which our children learn in as many days; it was the want of a certain analytical operation of science, an operation which does more honour to the inventive power of human wisdom, than all the mechanical and chymical (sic) arts by which the enlightened species make so great a figure in the world.[488]

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[486] PK II, 663.
[487] PK II, 626.
[488] PK II, 627.

But while the alphabetical method is "naturally perfect"[489] the English language he believed had become corrupt by discarding the principles of the alphabet, and despite the fact that there was as much science in England as anywhere else, the English had forgotten that their science had evolved from using the alphabet. Therefore, Hutton thought that it was foolish to ignore the principles upon which the science of Britain was founded.

Another example which Hutton gave to show that it is impossible to measure the advancement of a society based upon its linguistic development was China and how the Chinese writing system required a tenacious memory. But while he recognised that the Chinese did not have the advantages of the alphabetical method they did at least have the benefit of having their writing symbols utilized for international communication. Indeed, he thought that in spite of its deficiencies, "the Chinese have some reason, at least, to preserve their present orthography" whereas the "English have no reason to continue any manner of absurdity in writing their language."[490] So Hutton thought that the English language should not be allowed to degenerate into a writing system based on memory instead of rule and the way to do this was to return to the principles on which the alphabet was founded.

The alphabetical rule is that sounds and symbols correspond but this rule was corrupt by the eighteenth century. This corruption was the result of numerous factors but the most important changes occurred through urbanization, the technology of printing, and the development of the alphabet itself. Along with Christianization the alphabet arrived on the shores of England in the sixth century but speech had changed considerably over the years especially as a result of the mixture of dialects

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[489] PK II, 717-718.
[490] PK II, 717.

through urbanization. However, improvements in the orthography had not kept pace with the developments in the spoken language. The technological advance of printing also contributed to the changes in orthography. Indeed, Middle English spellings were the printed norm, but since the Great Vowel Shift speech had changed significantly to Modern English, and so English spelling had become frozen in the speech of the fifteenth century when the sound-sign system was much closer. Also, one of the major effects of printing was that since books were affordable to those who did not have a classical education, the translation of the Greek and Latin classics into English resulted in the introduction of thousands of adopted Greek and Latin words into the English language. But the spelling of these words was preserved in a revered etymological practice that created confusion and replaced the alphabetical rule as a standard. Therefore, by the eighteenth century a serious discrepancy existed in the English language as the same sound was not always attached to the same symbol.

One of the major causes of the corruption of English orthography was the adoption of foreign words which Hutton thought was "neither founded in science nor in wisdom"[491], and he illustrated how the preservation of etymology was reverential but nevertheless erroneous by responding to the supporters of this practice with sarcasm:

> What a transgression of the rules in our orthography, to write the word *philosophy*, for example, with the letter f, as we do *filiation!* for, this would betray an ignorance of the etymology of those two words. Now here is no question concerning etymology, for, it is not proposed either to dispute its use, or to deny the pleasure of this exercise of intellect. But, it may be allowed to demand, whether more general good, to language and writing, would not arise, from the losing this criterion of the Greek, in perfecting our orthography, than we have by preserving it, and losing the

[491] PK II, 657.

> benefit, to our orthography, of perfect science in a general rule. It is plain, that, to a person who understands Greek, and studies etymology, the word philosophy would be equally understood, whether wrote with the Roman f or Greek ϕ; and, to a person who understands not Greek, nor concerns himself with etymology, it is to no purpose the giving him a rule, by which he should know that certain words are derived from the Greek.[492]

The other major cause of the corruption of English orthography was that the same sound was not attached to the same symbol. Hutton thought that vocal sounds were being made without rule, and having the same sound not connected with the same symbol he believed was a threat to scientific accuracy. Thus the vowels in *speech* and *speak* are spoken alike but written differently, and neither of these two words are "sounded according to the Latin alphabet which we have adopted".[493] Another way in which linguistic confusion had arisen was through the interchanging of letters due to a particular national affinity of usage. Hutton gave an example of how a single word "Persia, as is commonly written" could be spoken in four different ways as it "may also be pronounced Perzia", then by changing to Hutton's fifth position of the modification of consonants it would be pronounced "Per*sh*ia" and then "by taking the sounded letter instead of the simply aspirated" it could be pronounced "Per*j*ia."[494] While Hutton acknowledged that this compound word would not present any difficulty in understanding, in other cases where a single consonant is altered the consequences could be far more significant. He demonstrated this point by showing how the sense as well as the sound might be altered as,

> Sot, for example, is a word which has a meaning in our language; then, in changing the aspirated for the sounded letter, we should have the word *z*ot, which would no longer convey the same idea. But in taking the sibilating modification of the fifth position instead of that of the fourth, we should have the word *sh*ot, which has a proper meaning of its own;

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[492] PK II, 658.
[493] PK II, 722.
[494] PK II, 702-703.

> and, in changing this for the sounded letter of the same species, we should pronounce *j*ot, a different word again.[495]

Therefore, Hutton had shown how the neglect of the elementary rule is critical in terms of accuracy as one error in a sound or in the representation of a sound can convey a completely different meaning and he put forward that it is "of great importance" to the accuracy of both speech and writing, "to understand the science of the alphabet, so as not to confound two different letters, however similar in their nature."[496]

Another side to the problem of English orthography put forward by Hutton was that it was either from "inaccuracy of pronunciation" or a "national predilection of one letter for another" that two letters of the same position of modification may be interchanged thus resulting in inconsistency.[497] Indeed, he thought that while vowels change in pronunciation within the areas of a nation, it is the consonants that are changed as the terms of one nation are adopted by another resulting in the cause of national errors. He attributed this idea to Johann Georg Wachter who had proposed that while dialects differ by vowels, languages differ by consonants.[498] Hutton observed that a deviation from the alphabetical rule occurred since although two consonants are from the same position of the vocal organ, one of these letters is sounding and the other is not. Examples of letters confounded are "the *p* and *b*, the *f* and *v*, the *theta* and *th*, the *t* and *d*, the *s* and *z*, the *k* and *g*, the *sh* and *j*."[499] And as well as the error of mistaking two letters from the same position of modification, there is also the "subject for error of the same kind in the two similar modifications

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[495] PK II, 703.
[496] Ibid.
[497] PK II, 702.
[498] PK II, 697.
[499] PK II, 702.

of the fourth and fifth positions, in which different parts of the tongue and palate are employed, as happens in the two sibilating modifications. *S*, of the fourth position, is thus confounded with *sh*, of the fifth."[500] So through the adoption of foreign words the national preference for a particular way of pronunciation results in a further gap between sounds and symbols.

Hutton thought that the gap that had materialized between English orthography and the alphabetical rule was shameful, and that we had reached a point in which we had "little dependence" upon the alphabet.[501] And he specified the errors evident in the English alphabet as:

> The alphabet which is taught in England consists of the following sounds; *e, i, a-e, o, i-u*; of these five there are but three simple vowels, *e, i, o*; for, the other two, *a-e, i-u*, are either diphthongs, or not a proper letter.
>
> Therefore, in the English radical alphabet, which consists of six figures, there are only three proper vowels; and, of these three, two have not the proper signs affixed to them; for the *e* is written with the sign of *a*, and the *i* with that of *e*, according to the Roman character which is adopted.
>
> Consequently, of the six vowels which are taught in England, or employed in their orthography, there is only one which is not taught erroneously. At the same time, in the English language, as spoken, there are no less than eight distinct vowels.
>
> Therefore, with regard to the radical or vocal alphabet of England, there appears to be only one, of the eight sounds, properly characterised; and there are seven gross errors committed against the principles of alphabetical orthography.
>
> The vowel, we have already shown, is not only essential in the formation of syllables in general, but is that element of speech which makes the proper sense, or marks the meaning of those simple words. Consequently, if the vocal alphabet, which is taught, contains seven errors out of the eight elements of which it is composed, it is almost the same thing to us, as if we had no alphabet for this most useful art of teaching the elements of speech. Let us now see how it is with the consonants, which are far from being erroneous in the English alphabet.
>
> In the English alphabet there are the following consonants; *b, c, d, f, g, h, j, k, l, m, n, p, q, r, s, t, v, x, z.* Of these nineteen letters there are three superfluous, viz. the *c* and *q*, which are supernumerary, and the *x*, which is a compound; so that these nineteen which are taught must be reduced

[500] Ibid.
[501] PK II, 703.

> to sixteen. Here, therefore, are three capital errors committed, in regard to the alphabet of consonants which is taught. These are in superfluity; let us now see what other errors there are in defect.
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> We find, in the English language, four different consonants for which we have not proper letters in our alphabet. These are first, the Greek or aspirated *theta*, and the sounded *theta*, neither of which have a letter appropriated as a sign, and which two letters are confounded in both being written with *th*; here are three errors in our practice. Secondly, the sibilating letter of the fifth position, which we write with *sh*; and, lastly, the nasal letter of the same position, which we write with *ng*. The sum, therefore, of errors, comprehending exuberancy (sic) and defect, which we find in the English alphabet of consonants, are no less than eight.
>
> Thus, in the whole English alphabet, as comprehending vowels and consonants, we find fifteen capital errors, or transgressions against the plain, simple, and only principles of alphabetical orthography.[502]

Therefore, without reform, since we were relying upon memory instead of rule, Hutton thought that written English could reach a point in which it had no relation to spoken English and the consequences for science in Britain would be dire.

While Hutton had responded against the theory of natural signs by the *philosophes* and in particular their practice of etymology, he was also scathing towards British authors who thought that the language ought to be based upon etymology. The situation was further compounded as an erroneous standard of spelling based upon etymology rather than phonetics had been fixed in the lexicography of Samuel Johnson's influential *A Dictionary of the English Language*.[503] The impact of Johnson's *Dictionary* was immediate as Adam Smith in spite of having a "very contemptuous opinion"[504] of Samuel Johnson, wrote in his 'Review of Johnson's *Dictionary*' in the *Edinburgh Review* that,

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[502] PK II, 704-705.

[503] Johnson, Samuel. *A Dictionary of the English Language.* London: J. Knapton; C. Hitch and L. Hawes; A. Millar; R. and J. Dodsley; and M. and T. Longman, 1756.

[504] AMICUS, 'Anecdotes tending to throw light on the character and opinions of the late Adam Smith, L L D,--author of the wealth of nations, and several other well-known performances' in *The Bee, or Literary Weekly Intelligencer.* Edinburgh: Mundell & Son, 1791. Volume III, Wednesday, May 11, 1791. 1-8.

> In this country, the usefulness of it will soon be felt, as there is no standard of correct language in conversation; if our recommendation could in any degree incite to the perusal of it, we would earnestly recommend it to all those who are desirous to improve and correct their language, frequently to consult the dictionary.[505]

Another British conservative subscriber of a standard language based upon etymology instead of alphabetical principles was James Beattie and he supported Johnson in his *Dissertations Moral and Critical.*[506]

Contrary to Johnson and Beattie, Hutton thought that etymologists were amiss in attaching extraordinary significance to the pursuit and he censured the supporters of the practice by pointing out the enormity of their transgression from proper orthographical principles. The only thing that Hutton thought would result from this practice of putting etymology before alphabetical rule was to make "our mind a dictionary", in other words at the expense of adhering to rule it requires us to rely purely upon our memory.[507] So instead of preserving foreign spellings, Hutton thought that words should be spelt to reflect the way in which they are spoken in English—with a phonetic system of spelling.

The solution to the problem of a corrupt orthography, Hutton thought, was to develop a perfect alphabet containing all the sounds of speech known to man and then apply it to the English orthography. So his remedy was to illustrate the "scientific principles of speech" as well as to show the "natural elements of those principles."[508] By employing the same methodology of remounting to principles that he had used throughout his metaphysics, Hutton returned to the fundamentals of

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[505] Smith , Adam. 'Review of Johnson's *Dictionary*' in the *Edinburgh Review*. Edinburgh: G. Hamilton & J. Balfour, 1755-56 as quoted in *Essays on Philosophical Subjects* by Adam Smith, ed. & introduced by J. C. Bryce. The Glasgow edition of the works and correspondence of Adam Smith, Volume III, Indianapolis: Liberty Fund, 1982. 241.

[506] Beattie, James. 'The Theory of Language' in *Dissertations Moral and Critical.* London: W. Strahan & T. Cadell, 1783.

[507] PK II, 730.

[508] PK II, 663.

language since the alphabet "should be a perfect thing, like the elements of geometry, as an error in those principles, if suffered to remain, must corrupt the science which should be founded on them."[509] Therefore, Hutton's geometric reasoning was also evident in his theory of written language.

While Hutton acknowledged that there had "not yet appeared any alphabet which in all respects is perfect"[510], he believed that by following certain principles it was possible to achieve a perfect alphabet. Indeed, he considered the alphabet as "containing the principles of language, and as being the rule of writing speech"[511], and he aimed to show that "a perfect and an universal alphabet" was a "practicable thing" so that there would "be a standard with which every erroneous alphabet might be compared."[512] Furthermore, Hutton aimed to correct the defects of language and pronunciation without, "making any application to particular national practices"[513] Therefore, while Hutton was most concerned about English orthography in order to bring about a national improvement, his initial method was to find a universal alphabet that could be used for all languages.

Hutton thought it was essential to remount to first principles or the elements of language in order to build a perfect alphabet. So he began his return to principles by descending through the variety of systems of writing known to humankind. The first system that he examined was the portion of speech as "a *whole*" whether this was "a book, a paragraph, or a sentence."[514] A species of this type of writing would be hieroglyphics and although the representation of "speech fixed in a body" was

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[509] PK II, 661.
[510] PK II, 663.
[511] PK II, 700.
[512] PK II, 703.
[513] PK II, 707.
[514] PK II, 635.

what first suggested "the utility of writing" to man, with progress the impracticability of this method of writing eventually became evident.[515] The second system of written language was words, which are the "last part, in the division of discourse, that has a proper meaning."[516] The advantage of this method of writing which Hutton referred to as the "verbal method"[517] was that the words of one language correspond with the words of another; however, the disadvantage of this verbal method of writing was that it would require the study of a lifetime. Hutton added a footnote prior to publication indicating that he had read *Bayeri Museum Sinicum*[518] and could "speak more distinctly upon the subject" of the disadvantages of this type of writing as was evident in the Chinese language.[519] The third system of writing speech was the syllabic, but learning characters for all possible syllables would also require a lifetime's study; and it would lack the advantage of the verbal method as it would be impossible to correspond between languages using figures for syllables, since unlike words, syllables do not have meaning. So Hutton then reduced speech to its most simple and elementary part, "a sound which cannot be divided" to acquire "the principles of our language."[520] This was the fourth system of writing or "elementary method" which is that of symbols to sounds the number of which according to Hutton could never "exceed thirty, which will comprehend all the vowels and consonants, *i.e.* the vocal sounds and articulators that can be well used in language."[521]

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[515] PK II, 636-637.
[516] PK II, 637.
[517] PK II, 642.
[518] Theophilus (Gottlieb) Siegfried Bayer (1694-1738) was Professor of Greek and Roman Antiquities at St Petersburg Academy of Sciences (1726-1738). A sinologist his *Museum Sinicum* (1730) was the first book on Chinese grammar published in the West.
[519] PK II, 639n.
[520] PK II, 643.
[521] PK II, 643-644.

Four requirements were proposed by Hutton for a perfect alphabet, and the first requirement was that it should contain every distinction of vocal sound, and each distinct articulation of human voice.[522] This requirement would result in a general alphabet to suit all languages since Hutton wrote that "the organs of voice are the same in every race of men."[523] So the alphabet would apply equally to all possible languages, and although "no nation, perhaps, requires to have every possible letter to be contained in their alphabet, which is the practical rule of their orthography, yet, science requires that we should understand the formation of every possible letter."[524] The second requirement of a perfect alphabet was that it should contain the fewest number of sounds and modifications possible. The letter *x* was given by Hutton as an example of our alphabet having a "useless exuberance of letters."[525] And a perfect alphabet should not contain compounds such as diphthongs or double consonants, although the orthography may contain "compendious methods" to characterise "either speech, or elements which are compounded."[526] By keeping this alphabet as simple as possible a third necessity was to avoid compounding it "with any other systematic typification (sic) of sounds, such as that of music, *i.e.* measures of time and intonation."[527] Finally, provided the alphabet was perfect then the writing "will be perfect; and the reading, which is the converse of writing, will be therefore perfect."[528]

Having established that it was necessary for one symbol to represent one sound in the alphabet, and since he thought that man was an "organised body" in which

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[522] PK II, 662.
[523] PK II, 661.
[524] PK II, 662.
[525] Ibid.
[526] Ibid.
[527] Ibid.
[528] PK II, 663.

speech had a restricted range, Hutton then put forward each of the distinct sounds of human speech.[529] He looked first at the vowels and then the consonants or the "natural constitution of vocal sound, and then the various modifications of that proper voice".[530] And since the range of vocal sounds were thought by Hutton to be limited in human nature, the pronunciation of the alphabet should, according to how each sound was expressed through voice and the position of the mouth, be clear and accurate. In Hutton's examination of the vocal sounds, which are the "first principles or the proper foundation of speech" he found that there are "seven distinct sounds natural to the human voice" and these are, "*a*, *η* (of the Greek), *e, i, o, υ* (of the Greeks), and the Latin *u*."[531] Hutton illustrated the pronunciation of each of the vowel elements in relation to how they sounded in particular words and he wrote that,

> In this radical alphabet, the *a* is sounded as in the English word *all*; or shorter, as in *man*. The second letter in this vocal alphabet is the *eta* of the Greeks; it is sounded as the *e* in the words *men, guess, ken, let, sell*. The third letter is the *e* of the French, as sounded in the infinitive of their verbs terminating in *er*, or in the other tenses before the *z*; and in the English words *way, say*. The fourth letter is the *i*, a letter sounded properly, that is, uniformly, by perhaps all nations except the English, who, in place of this simple vowel, substitute the diphthong *ae*. This vowel is properly sounded in *me, we, ye*. The fifth letter, *o*, is perhaps sounded properly by every nation that has an alphabet. The having an *omicron* and *omega* of the Greeks, if only differing in long and short, was certainly superfluity, which in science should be retrenched. The sixth letter here proposed is the *upsilon*, as supposing this was the sound given to it by the Greeks; however that be, the sound here understood is that which the French give to their *u*, or the sound which is given in their words *feu, buvez*. The seventh and last of these vocal sounds is what we suppose the *u* of the Latins to have been, and which is now sounded in French when *o* is put before it, as in *vous, pouvez*. In English, this sound is absurdly wrote often with an *o*, particularly with the double *o*, as in

[529] PK II, 646.
[530] PK II, 663.
[531] PK II, 664.

> *too, good.* This letter, in the English pronunciation of the alphabet, is commonly made a diphthong, in which the *i* or *iota* is first sounded.[532]

After describing the sounding of vowels in reference to particular words, Hutton then illustrated how these sounds are made so that they can be understood by someone unfamiliar with these words. And by describing the vowels in such a specific way Hutton was also discriminating them from all other types of sound. This was accomplished on a physiological basis, so for each of the vowels Hutton described the conformation of the mouth and the position of the tongue in relation to the palate, the lips, and the teeth. An example of how he described the way in which each sound was made is evident in the case of the letter *i*

> Thus the conformation of the mouth, in sounding the letter *i*, seems to be the best adapted for the sharp, as the cavity of the mouth is here the most diminished, by making the whole tongue approach near the palate, the two sides of the tongue being closely applied to the palate, and a narrow channel formed in the middle, through which the sound is made to pass. In this cavity is formed the sound of the letter *i*, independent of the teeth, or cavity which may be made before them by the lips.[533]

Therefore, through his belief that vocal sounds are fixed in the human constitution and his description of how each sound was made, Hutton's universal alphabet was physiologically based.

Hutton thought that the sounds of the human voice were fixed in nature for man to discover and subsequently make an art of language. Indeed, just as there was order in the human mind, there was order in the "precisely seven"[534] vowel sounds of the human voice. Therefore, the finite number of sounds was benevolently designed by God as otherwise there would be Babel. And he noted that it is evident "that man is thus calculated by nature for speech, by having the organ of sound determined to

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[532] PK II, 664-665.
[533] PK II, 667.
[534] PK II, 650.

act in a certain manner."[535] So by performing his analysis Hutton believed that he had arrived at the "natural element" or the "limit of our knowledge."[536] As a consequence of there being a "certain number of distinct articulating powers" and "precise vocal sounds" in the "constitution of man"[537], then the "formation of an alphabet has been an operation perfectly scientific, in proceeding to distinguish in words syllables, and, in syllables, elementary parts, which are fixed, definite, and unalterable."[538]

After considering the "natural constitution" of vocal sounds or vowels, in his analytical examination of the alphabet, Hutton then turned his attention to the various "modifications" of voice, or consonants.[539] Just as he had done with the vowels and the voice organ, Hutton described the position of particular parts of the mouth in relation to one another, and distinguished the "active operation of the breath and sound, combined with the position of the mouth, for the general end of pronunciation" of the consonants.[540] He also explained how some consonants are sounded or "liquid" consonants while others are not sounded or "mutes".[541] The throat is the "proper organ for producing sound" or forming vowels, but the consonants articulate these sounds in the mouth which is the "proper organ for modulating" sound, thus forming "speech or human language."[542] Therefore, by terminating or preceding a vocal sound, a consonant is an 'element' in speech, and because it is by a modification of the "articulating organ or mouth that this effect is

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[535] PK II, 651.
[536] PK II, 675.
[537] PK II, 653.
[538] PK II, 655.
[539] PK II, 663.
[540] PK II, 678.
[541] PK II, 677.
[542] Ibid.

produced," Hutton distinguished the consonants "upon mechanical principles."[543] Attempting to leave no stone unturned in his *Science of the Alphabet* Hutton described in detail how individual letters are formed and this was followed by a description of how articulations of two or more letters are formed. He also dealt with four distinctions in the consonantal alphabet: those between perfect mutes and imperfect mutes as well as perfect consonants (or sounding letters) and imperfect consonants (or aspirated consonants).[544] And he even extended his examination of the alphabet to the theory of "speaking without voice" or the "whispering operation", and how the alphabet was pronounced by the "whispering organ" in speech "below the breath."[545]

Once he had completed his description of the alphabet, Hutton drew an *Analytical Table of the Articulating Powers* which gave his analysis of the "positions of the organ for articulating voice, and the modifications of those positions, as well as the modifications of sound, or the employment of the voice and breath in forming speech."[546] And by drawing and then examining this 'alphabetical table', Hutton thought that it would be easy to recognize from the articulators which letters are "closely allied" in their formation, and which letters would "most naturally be changed for others, in the transference of speech from men to men" as the purpose of this was to identify which consonants were mistaken in the national choice of adopting one of two similar modifications of sounds.[547] The table also exhibited the "distinction between the natural differences of languages, and those of dialects" and he referred to Wachter who gave "a very proper definition with regard to this subject,

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[543] PK II, 678.
[544] PK II, 712.
[545] PK II, 688.
[546] PK II, 695.
[547] PK II, 697.

as mentioned by M. de Brosses, in saying, that languages differ from one another by consonants, and the dialects by the vowels."[548] Although Hutton included the Spanish *ll* and the English *ng* in his table, he thought that neither should be

> admitted as a distinct letter in the alphabet [that is the English orthography not his general alphabet which of course they were a part of]; seeing they are indistinguishable, in the effect, from that which is produced in speech by employing the elements which must be necessarily admitted as the principles of our speech.[549]

He felt the same in regards to the Northumberland (or guttural) *r*. But his alphabet came in for criticism for not examining enough languages as *The Critical Review* noted that if the "Spanish is to be introduced, why not the peculiar sounds of the Germans and the Arabians?"[550]

Once the scientific principles of orthography or the alphabetical rule was fixed in one symbol for one sound Hutton thought it was of great importance not to deviate from it. He considered diphthongs, in the word *Caesar* for example, are "very improperly employed as a type of figure in orthography" since two vowels written in a single syllable and sounded as a single vowel "is not a diphthong; it is only an absurdity."[551] Thus he pointed out that if the word "*Caesar*" was to be written differently from our speech and was to retain the Roman orthography then why was the Roman pronunciation not retained which he supposed was "*Kysar.*"[552] But Hutton provided few examples of how the orthography would appear using his system although one was that the words "*what* and *which*" should be written as "*haut* and *huitsh*"[553]

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[548] Ibid.
[549] PK II, 692.
[550] *The Critical Review*, Volume XIX March 1797, 312.
[551] PK II, 699.
[552] PK II, 698.
[553] PK II, 694.

Having fixed the symbols of the perfect alphabet, Hutton believed that this could then be applied to the language of any nation, and he gave an example of the universal alphabet "adapted to the language of this country,"[554] which was

> First, Vowels, in the order of pronunciation; beginning at the highest, or most acute, and ending with the lowest, or most grave.
> These are the perfect vowels.
>
> *i, e, η, a, o, υ, u.*
>
> To these perfect vowels, we are to add the two semitones or imperfect vowels, which are expressed in the words *this* and *thus*. Let us suppose these to be typified by a small *i* and *u*, thus, *îû*. The Greek characters have a line under them.
>
> Secondly, Consonants; taking the five positions of the organ for the order in which they shall be classed and announced.
>
> First position, *p, b, m.*
> Second position, *f, v.*
> Third position, *θ, th.*
> Fourth position, *t, d, s, z, r, l, n.*
> Fifth position, *k, g, sh, j, ng.*
> To which must be added the aspiration *h.*
>
> Thus it will appear, that we have, in our alphabet, nine vowels, (one of which the English have not), seven perfect, and two imperfect. Of these seven, two of the signs here given are Greek letters. The two imperfect vowels have here only an arbitrary mark.
>
> Of the consonants again, we have twenty. Of these, only fifteen have proper Roman characters. I have taken a Greek character for one of the other five; and the remaining four are expressed with the double letters which are employed for that purpose presently in our orthography. These, with the aspiration *h*, and the consonant *u* complete the enumeration.[555]

In referring to adapting the universal alphabet to the language of 'this country' Hutton clearly meant Britain, since 'one of [the nine vowels] which the English have not' was what he had earlier referred to as the "Scots" *upsilon*.[556]

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[554] PK II, 713.
[555] PK II, 713-714.
[556] PK II, 672.

The physiological description of Hutton's universal alphabet was derived from a basic self-analysis. This was evident in Hutton's description of the difficulty in pronouncing the two imperfect vowels "when they are continued as a vocal sound" as he wrote that, "I find this to be the case with myself; and I presume this is the case in general, as I do not find one word in any language, so far as I know, in which they are not of the shortest pronunciation."[557] Also in self-analysis Hutton distinguished between his vocal octave and that of Antoine Court de Gébelin, with Hutton putting forward that he had reasoned *a posteriori* with regard to his vocal octave while Gébelin in his *Origine du Language* had "discovered his vocal octave by reasoning *a priori*."[558]

Hutton's external proof that the restricted range in the elements of speech was physiologically fixed was that deaf and dumb persons pronounce the sounds of the alphabet. He referred to Thomas Braidwood at whose *Academy for the Deaf and Dumb*, nicknamed the Dummie Hoose, the deaf and dumb were taught to read and write.[559] Hutton wrote that Braidwood "teaches dumb or deaf people to pronounce; now, How could Mr Braidwood teach this to a person, if there were not, in our organs of speech, a certain definite manner in which they are made to act?"[560] Indeed, in 1779 in his *The History of Edinburgh* Hugo Arnot wrote that "the boys" of Thomas Braidwood's *Academy* "could converse by the help of the artificial alphabet

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[557] PK II, 673.
[558] PK II, 676.
[559] Thomas Braidwood (1715-1806): in 1764 he opened the *Academy for the Deaf and Dumb* in Edinburgh, the first school for the deaf in Britain, and he developed a sign language that was the forerunner of the British Sign Language that is in use today. Braidwood left Edinburgh for London in 1783. The *Academy* received international acclaim as pupils from England and as far as America and Sierra Leone attended classes. It was situated in the Dischflat where the Dumbiedykes (pronounced and once spelled Dummiedykes) housing scheme is today and where the community centre is named in his honour. [*The History of Edinburgh* by Hugo Arnot. Edinburgh: W. Creech, 1779. 425-426. and *The Place Names of Edinburgh: Their Origins and History* by Stuart Harris. Edinburgh: Gordon Wright Publishing, 1996. 246.]
[560] PK II, 648.

they learned."[561] However, Arnot also noted that Thomas Braidwood "begins with learning the deaf articulation, or the use of their vocal organs; and, at the same time, teaches them to write the characters, and compose words of them" but, the "deaf (Mr Braidwood observes) find great difficulty in attaining pronunciation, but still more in acquiring a proper knowledge of written language."[562] So Hutton's proof of the elements of speech having a physiological basis that he based on the pronunciation of the deaf was not as straightforward as he would have liked his readers to believe. Nonetheless, although his *a posteriori* reasoning that led to the physiological description of how each sound was made was basic, Hutton's thoughts were sophisticated for the period and they were made at a time when experimental phonetics was in its infancy. Having advanced his solution to orthographic problems in the *Science of the Alphabet*, Hutton then held that there are two main advantages of this system of 'perfect' written language: the first "relates immediately to the people, the other to the language."[563]

The first main advantage of adhering to the *Science of the Alphabet* Hutton thought was "great facility and perfection in learning to read the written language, and to write the speech."[564] As it was in Hutton's time, and still is today, the absurdity of un-phonetic spelling in the English language with the misapplication of nearly all of the vowels as well as some consonants has resulted in a reader and writer of English requiring a "tenacious memory" and his abilities can be measured in relation to the "greater or lesser degree of memory, or retentive faculty, which he

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[561] Arnot, *The History of Edinburgh*, 426.
[562] Ibid., 425.
[563] PK II, 719.
[564] Ibid.

possesses."[565] To illustrate the corrupt roots of this problem Hutton gave an example of the French word *flambeau* which has been introduced into the English language without modification noting,

> Now is there, at the reading-school, an ignoramus, who would not spell the word *flambo* (with an *o*) as it ought? And do we not all remember, to have once valued ourselves on our literary achievement, when we had learned the modish error, in reading or spelling *flambeau*? But whether it is of most importance to a boy, to learn, upon the one hand, the derivation of a word, or, on the other, to see the analysis of his speech. If a boy could think, as he ought to think when he is a man, how absurd would he find his master's system!—first, to give him a rule to remember; and then to learn (sic) him to transgress that rule without reason! But, in place of discovering the absurdity of his master's system, he is thus habituated to suffer inconsistency to mingle with his science; and he is trained to reason upon false principles, or, which is worse, to believe, without a principle of truth. Thus the docility of youth lays the foundation, either for dogmatic ignorance, on the one hand, or the infallibility of science, on the other, according as the growing mind happens to be directed in its artificial education. By this docility, science may be taught to a man, as speech is to a parrot, without being understood; and conclusions are formed, without seeing the principles from whence they flow, that is to say, principles are admitted, without knowing the truth or evidence on which they rest.[566]

Therefore, it was important to learn the general principles of writing and reading, since the particulars do not increase understanding but merely "load the memory."[567] So instead of erroneously teaching language based upon etymology the correct principles should be "infused into the pupil's mind."[568] Consequently, Hutton believed that the first advantage of adhering to the alphabetical method would be that reading and writing could be taught to perfection in a "few days"[569] in contrast to the way that learning to read and write takes years to learn through memorization.

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[565] PK II, 720.
[566] PK II, 721.
[567] PK II, 657.
[568] PK II, 713.
[569] PK II, 644.

In opposition to the English orthography being ahered to upon the alphabetical rule were those in support of preserving the etymology such as Samuel Johnson and James Beattie. Despite acknowledging that the alphabet was "imperfect" and spelling was "irregular", Beattie thought that "neither ought to be altered."[570] Johnson was not in favour of change and he asked rhetorically, "who can hope to prevail on nations to change their practice, and make all their old books useless?"[571] But in response to this attitude Hutton wrote that,

> The case, indeed, seems desperate; But why? only because we are not willing to undertake the remedy. The case may now be stated thus: At present, with our corrupt orthography, we have difficulty in learning to read and write with propriety our own language; but, when we have once acquired this art, however imperfect, we read with facility modern writings, while we have some difficulty in reading the old manuscripts of this country. On the other hand, if we should correct the errors of our writing, and perfect our orthography, then, though we should learn with great facility to read and write with every possible perfection, yet former writings would be troublesome to read; in like manner as our antiquated language is at present. Now, the answer is plain; if it be truly worth our while to correct the error of our orthography, and thus to acquire all the facility, beauty, or simplicity of the art, the inconveniency of reading those books which are truly useful will soon be removed, in the exercise of the art of printing, now possessed in such perfection.[572]

Beattie followed Johnson's position, indeed he thought that orthographic reformation would be impracticable and British heritage would be harmed as old books would be rendered obsolete since "old authors would erelong be laid aside as unintelligible, and the new could be consigned to oblivion before their time."[573] But against this attitude Hutton sarcastically noted, "As for those books, again, which are not truly useful and would not be reprinted, the difficulty of reading them would perhaps

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[570] Beattie, 'The Theory of Language', 260.
[571] Johnson, Samuel. 'A Grammar of the English Language' prefixed to *A Dictioanry of the English Language: Volume One*. London: J. Knapton; C. Hitch and L. Hawes; A. Millar; R. and J. Dodsley; and M. and T. Longman, 1756.
[572] PK II, 731.
[573] Beattie, 'The Theory of Language', 262.

enhance the value of the operation."[574] Furthermore, as Hutton thought that the advantages of improving the orthography far outweigh the disadvantages and that books which still held relevance would be rewritten in the improved language, he wrote that

> nothing, upon the whole, would suffer from this step of our improvement. The value of a particular edition of a work would fall; but the literary property in general would rise. By how much the value of old books were diminished, by so much that of new books would be increased; and, though no former writing would become difficult in any considerable degree, no future writing would transgress the perfect rule, in conforming to the principles of our speech.[575]

Therefore, Hutton's method would be applied to future literary works and past works of merit could be reprinted in the revised orthography. Moreover, Hutton pointed out to those who resisted change that their objections were an acknowledgement that they themselves realized that there was "error in our science" but that these objections were founded upon inconveniency "in correcting the error of our practice."[576] And to those who refuted a "perfect system of written language"[577] because it has shortcomings, for example it does not correct the fault of homonyms such as "*hare* and *hair*, *hear* and *here*"[578] which are found in the "living language", Hutton thought that this was not reason enough to adopt "an erroneous system of written language" for if we do, "we only multiply error."[579]

This was an era during which the ascendancy of the middle class and a preoccupation with standardization was rife. Those without a 'tenacious memory' and who spelt incorrectly were subjected to ridicule and it was the "fear of such

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[574] PK II, 731-732.
[575] PK II, 733.
[576] PK II, 731.
[577] PK II, 730.
[578] PK II, 728.
[579] PK II, 730.

ridicule that the spelling book writers relied on to produce their adult audience."[580] Countless authoritarian books of correct usage were published to teach 'proper' linguistic behaviour based upon memorization and this was exactly in keeping with the demands of the market since the "insecure do not want theory, speculation, abstraction, or exceptions; they want hard and fast practical rules that are easy to understand and memorize."[581] Thus spelling was considered in the eighteenth century to be a measure of politeness and this was evident in a letter that Lord Chesterfield wrote to his son on 19 November 1750 regarding the conduct of gentlemen,

> I come now to another part of your letter, which is the orthography, if I may call bad spelling *orthography*. You spell induce, *enduce*; and grandeur, you spell *grandure*; two faults, of which few of my house-maids would have been guilty. I must tell you, that orthography, in the true sense of the word, is so absolutely necessary for a man of letters, or a gentleman, that one false spelling may fix a ridicule upon him for the rest of his life; and I know a man of quality, who never recovered the ridicule of having spelled *wholesome* without the *w*.[582]

Hutton, on the other hand, was in no way calling for greater politeness but was simply wishing to improve scientific accuracy.

The second main advantage of using a perfect written language Hutton advanced was the "stability of the spoken language, and security from innovation or corruption."[583] He thought that if the orthography conformed to alphabetical principles then the spoken language would remain stable since if pronunciation was corrupted there would always be a written alphabetical standard based upon elemental sounds that were physiologically fixed with which to return to. So Hutton

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[580] Scragg, D.G. *A history of English spelling*. Manchester: Manchester University Press, 1974. 88.
[581] Millward, C.M. *A Biography of the English Language*. (2nd ed.) Fort Worth: Harcourt Brace, 1996. 226.
[582] Lord Chesterfield a letter to his son: 19 November 1750 cited in D.G. Scragg *A history of English spelling*. (Manchester: Manchester University Press, 1974.) 90.
[583] PK II, 719.

believed that a proper orthography accurately reflecting speech would also lead to improved pronunciation as a "just orthography necessarily leads the people to a just pronunciation of their language, or to perfect speech; whereas, an erroneous orthography necessarily leads to unjust pronunciation, or imperfect speech."[584] At the time the middle class had a preoccupation with a standard pronunciation and wished to 'correct' their pronunciation so as to sound similar to those they considered as their betters. But whether this standard was based on an Edinburgh or a Metropolitan London style it was nevertheless an elite standard. Conversely, not only did Hutton assert that language should be standardised based on alphabetical principles which would lead to more accurate scientific knowledge, but as his perfect alphabet would lead to improved literacy it was the antithesis of an elitist standard pronunciation.

Speech is constantly changing in various parts of the nation but Hutton thought that by adhering to alphabetical principles then regional dialects could be eradicated. He noted that since the "practice of speech" was "acquired by the ear" this resulted in the dialects of a language.[585] His explanation for this was that over a period of time vowels change due to the "inaccuracy of people's ears" and this "will naturally bring a disorder, which will change the vocal speech of different districts."[586] And he thought that there is "not perhaps a tongue on earth, which has departed so much from the general alphabetical pronunciation, as the English."[587] Again Hutton's solution was to teach the language "upon principle" since he

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[584] Ibid.
[585] PK II, 701.
[586] Ibid.
[587] PK II, 659.

believed this was the "most effectual" way to have the language spoken the same throughout a nation as

> Nothing is more certain than the teaching the proper speaking of a language by the ear; but it is impossible that every ear in a great nation can be habituated to the same manner of speech; for, whether we consider the natural improvement or the natural corruption of a language as changes happening in different degrees in different places, the people in a nation, who speak the same language, will be found to speak it variously in the different places of the kingdom. This is the nature of things, and it is fully confirmed in the actual state of nations with regard to speech. Now,
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> If there be a natural tendency to diversify the speech of the same nation in its different parts, there ought to be contrived, in the art of man, a remedy against this growing inconveniency; that is, some principle operating with a contrary tendency, as bringing the various modes of speech to one common standard. But this can only be done by teaching speech upon principle, that is, analysing speech to its elements, and ascertaining the sound of these fixed characters in giving a scientific description of each. This is the science of the alphabet; and, that this is a practicable thing has been already shown.[588]

So Hutton thought that the application of the elemental method would also eradicate dialects so that a nation's speech would become standardized on a restricted range of sounds fixed in man's constitution as he thought that "the language of a nation should [and he believed could] be every where spoken in the same manner."[589]

Those who advocated the preservation of etymology also tended to take the position that a standard pronunciation should be based upon the style of speech of the elite of the South East of England. Samuel Johnson supported an elitist pronunciation as he believed that, "the best general rule is, to consider those as the most elegant speakers who deviate least from the written words", words which he thought should be written based on etymology.[590] However, having the language preserved etymologically is itself elitist since it requires greater time to learn than

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[588] PK II, 726-727.
[589] PK II, 726.
[590] Johnson, 'A Grammar of the English Language'.

language based upon phonetic rules. Furthermore, James Beattie, one of the leading Scots Anglicizers, wrote in his *The Theory of Language* (1783) that,

> Now it is in the metropolis of a kingdom, and in the most famous schools of learning, where the greatest resort may be expected of persons adorned with all useful and elegant accomplishments. The language, therefore, of the most learned and polite persons in London, and the neighbouring Universities of Oxford and Cambridge, ought to be accounted the standard of the English tongue, especially in accent and pronunciation: syntax, spelling, and idiom, having been ascertained by the practice of good authors, and the consent of former ages.
>
> And there are two reasons for this preference. One is, that we naturally approve as elegant what is customary among our superiours (sic). And another, and a better, reason is, because the most enlightened minds must be supposed to be the best judges of propriety in speech, as well as in every other thing that does not affect the conscience.[591]

But Hutton would have thought it preposterous that those in 'London, and the neighbouring Universities of Oxford and Cambridge' were in any way 'superior' to the literati in Edinburgh or more 'enlightened' than his friends at the Lunar Society in Birmingham. Indeed, the raison d'être of his *Science of the Alphabet* was to impose a standard pronunciation based upon rule which was antithetical to the elitist pronunciation of Johnson and Beattie. This was also contrary to the elocutionist beliefs of the time and so this indicates that Hutton did not consider himself inferior in the way that many of the *literati* had done when they attended the 'Select Society for Promoting the Reading and Speaking of the English Language in Scotland.'

Contrary to the elitists, Hutton thought that a proper written standard for pronunciation would have "no dependence upon the fashion of a Court, nor the customs of a capital" but would instead conform strictly to the alphabetical rule.[592] Furthermore, he decided,

> To illustrate this by a familiar example: Suppose I, who live in Edinburgh, were to conform my pronunciation to that which is practised

[591] Beattie, 'The Theory of Language', 297-298.
[592] PK II, 723.

> at London or the Court; I have no other method of attempting this, except in going to Court, or conversing here with people who had learned their language in the capital. But, were the orthography of the English tongue compleat (sic), I should only need to learn the proper pronunciation of each letter in the alphabet; and then, the first good English writer would teach me the just pronunciation of the English language. Now, having learned the just pronunciation of the English tongue, or proper spelling of our language, I could judge every author who should attempt to alter the orthography; and, at the same time, I should be able to distinguish every alteration in speech which departed from the common rule. No man then could learn to read a book, without learning at the same time to speak with accuracy and propriety; and, no man could write with judgment, without giving a standard for the language of his country.[593]

Indeed, the fashionable pronunciation of the Court and polite London society was just as erroneous as regional dialects since it failed to adhere to scientific principles. More importantly, Hutton's idea was the antithesis of the elitist's scheme since he thought that "Every man in the kingdom, who can read the alphabet for a halfpenny, has in his hand the authority of state, which, though in this particular not above the rule of reason, is, when in corroboration of it, absolute and omnipotent."[594] Therefore, this implies that a standard pronunciation based on Hutton's *Principles of Orthography* would decrease regional barriers. Indeed, although Hutton was directing his work to the intelligentsia with the aim that they would adopt his theories, consequentially these improvements if practised by teachers would benefit children and the lower classes with the result of a more just society. Such a reform would of course have had considerable political implications, but deep-seated prejudices by those who judge men by accent and who wished to maintain the status-quo of an erroneous orthography based upon etymology obstructed the advancement of the lower classes and their struggle towards literacy. While Hutton's intention was to increase literacy through a phonetic system to make learning to read easier;

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[593] PK II, 723-724.
[594] PK II, 723.

ironically in the current 'erroneous' etymologically-based system it was, and is, the poorly educated who are more likely to spell 'correctly' on an alphabetically-based system but are ridiculed as a result. But Hutton wrote that,

> Those who have the power to make a reformation, have no inclination to labour for the common good; and those who are to be benefited by the innovation, have no power in the empire of letters. The case, indeed, seems desperate; But why? only because we are not willing to undertake the remedy.[595]

So while he thought that a just pronunciation was the second advantage of a perfect orthography, Hutton realised that his *Science of the Alphabet* was unlikely to be accepted.

Another objection against changing the orthography made by Samuel Johnson was due to the impracticality since language is living and over time a mismatch between speech and writing develops. Indeed, he thought that some reformers have "endeavoured to accommodate orthography better to the pronunciation without considering that this is to measure by a shadow, to take that for a model or standard which is changing while they apply it."[596] And James Beattie who thought that "pronunciation ought to determine orthography" agreed with and quoted Johnson by stating that it was impossible to maintain a standard written language based upon spoken language as speech was constantly changing.[597] But Hutton was well aware that as it naturally improves "changes happen to the language by almost imperceptible degrees" and that speech "in a nation, is a living thing."[598] Indeed, written language is unable to keep pace with the changes in spoken language. However, Hutton thought that in order to tackle the resulting disparity of speech and

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[595] PK II, 731.
[596] Johnson, 'A Grammar of the English Language'.
[597] Beattie, 'The Theory of Language', 262.
[598] PK II, 659.

writing, the orthography would be required to be "founded on the scientific principle" of one symbol to one sound, and then

> nothing would be more easy than to conform the writing to every improvement admitted into the art of speech; it even could not fail of being thus practiced, as, the least departure from the accurate principle would be an evident transgression of the rule.[599]

Contrary to the etymologists he thought that,

> The pronunciation of a language, or the art of speech, ought not surely to follow the orthography or rule of written language, as this would be contrary to the natural course of things; for though, in reading, speech seems to follow the rule of writing, yet, in reading, according to the elemental method, we do nothing but return the sign or figure into its native sound. Therefore, the rule of writing must be founded in the pronunciation; and, the art of writing should follow the improvements of a people's speech.[600]

In other words, by adhering to the "natural order of reading and writing" in which the orthography follows the speech then according to Hutton it was possible by using the elemental method to return to accuracy.[601] And again the necessary remedy was to learn and adhere to the orthographic principles using the elemental method since,

> Every language may be considered as always changing, and, with the enlargement of science, ought to be improving; but, however guided with the pleasure of the ear, and the facility of pronunciation, the living speech may be improved, yet, the science of that language, and consequently the orthography (which is founded in this alone) can only be preserved by the employment of the understanding.[602]

Therefore, without widespread knowledge of the principles of orthography the written language is unable to keep up with the changes in the spoken language. Although writing follows speech in the natural order, since the pronunciation and the orthography do not correspond due to the departure from rule which multiplies over time, Hutton believed that in order to achieve perfect speech and writing, an

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[599] PK II, 660.
[600] PK II, 659.
[601] Ibid.
[602] PK II, 725.

interdependence exists whereby it is only by performing the "clear distinction of elementary sounds" that there is an "unequivocal pronunciation of speech", and it is "only in this perfect execution of speech, that an expression may be wrote, by the art of man, without difficulty or error."[603] Hence the accuracy of written language was for Hutton reliant on pronouncing speech unequivocally, especially clear and distinct vowels, and provided that speech was expressed clearly then it could be written accurately even though it might not be understood.

While Hutton's *Principles of Orthography* was not what has been termed a 'universal language scheme', he did however believe that it was possible to write from hearing distinct sounds without the need to understand what was being said. Consequently, despite the fact that Hutton did not think that error would be completely eradicated by using a perfect alphabet, he did believe that since language is living it is by continually returning to alphabetical principles that error would be kept to a minimum and scientific accuracy would prevail. In this point, Hutton was aware of one of the pitfalls involved in the construction of a universal alphabet as even if a symbol matches a sound adequately then the symbol will subsequently be inadequate through changes in the sound, and unless spelling or alphabet reform is conducted regularly the match between sound and symbol will continually fluctuate. But of course Hutton's solution to this difficulty was to employ his method of continually remounting to principles.

Numerous attempts throughout history have been made to construct a universal alphabet, but it is a difficult task. The most important issue to be considered in devising a universal alphabet is that a chosen symbol should represent

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[603] PK II, 665.

only one sound unambiguously. However, the main difficulty is that there is no existing alphabet that has an adequate amount of unambiguous symbols. An example of this difficulty in English is that the letter *c* can represent both the sounds of *s* and *k*, as in the words *city* and *cat*. On the other hand, each sound should be represented by only one symbol and English orthography again falls short as the sound *s* can be represented by either *s* or *c*, as in the words *sit* and *city*.[604] In Hutton's elementary method the number of distinguishable figures he thought can never "exceed thirty, which will comprehend all the vowels and consonants, *i.e.* the vocal sounds and articulators that can be well used in language."[605] So while he was attempting to construct a perfect alphabet that would contain every possible sound required for speech without, "making any application to particular national practices"[606] he was well short of all the human sounds of speech. Indeed, the English language itself has over forty; and while Hutton anticipated much of the work that was completed in the late nineteenth century, his universal alphabet was well short of the over one-hundred sounds in the International Phonetic Alphabet. Nevertheless, Hutton's *Principles of Orthography* was considered innovative as *The Analytical Review* believed that in it "the reader will find several new and judicious animadversions on our english (sic) orthography."[607]

Although Hutton's *Principles of Orthography* was a pedagogical, social and cultural response against the adherents of etymology, it was, as with the rest of his metaphysics, primarily an epistemology to test science and to show how there is

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[604] Kemp, J. Alan. "The history and development of a universal phonetic alphabet in the 19th century: from the beginnings to the establishment of the IPA" in *History of the Language Sciences: An International Handbook on the Evolution of the Study of Language from the Beginnings to the Present*. Volume 2. Berlin: Walter de Gruyter, 2001. 1572-1584. (1573)
[605] PK II, 643-644.
[606] PK II, 707.
[607] *The Analytical Review*, Appendix to the Twentieth Volume—September to December 1794., 465.

design and order in the universe. Indeed, as with his metaphysics as a whole Hutton provided evidence of design and order in speech as being benevolently only a "certain number of distinct articulating powers" and "precise vocal sounds" in the "constitution of man"[608] so that a system of language could be artificially constructed. It was also directed towards the literati since it was within their control to make the necessary changes that the language needed. Another aspect of *Principles of Orthography* that was parallel to Hutton's metaphysics as a whole was that there was evidence of his geometric influence as well as his method of remounting to first principles.

The critical factor in Hutton's elementary method was that the elements were based in human nature and "nothing should be considered as belonging to the natural alphabet, or as a principle in speech, but what is properly defined."[609] In other words, only those sounds which are universal in human nature and that have been defined in the range of vocal sounds as well as the articulations of these sounds are the principles of speech belonging to the elementary alphabet. But within his analysis although Hutton thought that speech and writing were devised by the art of man, the restricted range of sounds in human speech were the "effect of an intelligent design, by which he [mankind] had been adapted in body and mind for this discovery."[610] Furthermore, while brutes have the means for making sounds, even if there is no obvious end for these sounds Hutton made the extraordinary remark that one end which he conjectured upon is that the cries of brutes might have been a device by an intelligent designer to teach language to man through man's imitation of

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[608] PK II, 653.
[609] PK II, 706.
[610] PK II, 646-647.

brutes.[611] Therefore, humans had been benevolently endowed with a limited number of vocal sounds so that the alphabet could be constructed artificially to become the "glory of science" which after speech Hutton considered to be the greatest accomplishment of humankind.[612]

As with his work as a whole Hutton was addressing the literati when he appealed for the orthography to follow the speech, but he would have found it impossible to persuade the ardent adherents of etymology. Of course Samuel Johnson had earlier noted that a "great orthographical contest has long subsisted between etymology and pronunciation"[613], but Johnson's attitude was that the preservation of etymology was to be upheld. And James Beattie, a follower of Johnson, wrote that reforming the language to a standard based upon pronunciation "would obliterate etymology, and, with that, the remembrance of many old customs and sentiments, would take away from the significancy of many important words, and involve in confusion both our grammar and our policy."[614] Hutton on the other hand expressed that those who cultivate the art of orthography can simultaneously transgress the orthographic principles in a gross manner and thought that there is no compensation for ignoring orthographic principles as we continue to practice an erroneous orthography only because we have "so widely departed from the truth of scientific principle."[615] Indeed, he reprimanded gentlemen of science by noting that his appeal was "not addressed to the vulgar, who without thought practice the art of writing, as they had been taught; it is addressed to men of science, who must know

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[611] PK II, 647.
[612] PK II, 655.
[613] Johnson, Samuel. *The Plan of a Dictionary of the English Language; Addressed to the Right Honourable Philip Dormer, Earl of Chesterfield, One of His Majesty's Principal Secretaries of State.* London: J. and P. Knapton, T. Longman and T. Shelwell, C. Hitch, A. Millar, and R. Dodsley, 1747. 9.
[614] Beattie, 'The Theory of Language', 262-263.
[615] PK II, 734.

the reason why a thing is done; and who ought to seek a better motive for their acting, than their father had done so before."[616] So to both the English and Scots literati "who have the power to make a reformation"[617] Hutton appealed that they would return the language to the principles upon which it was founded.

Hutton provided an analogy of the principles of the art of speech with the art of measuring in geometry to show how going back to first principles was the only way to build a solid foundation of alphabetical principles.[618] Indeed, he noted that the

> alphabet being the scientific rule or natural principles of our speech, and also of our written language, these principles cannot be employed, in science, without knowing their truth; no more than in the science of mathematics, could proposition be employed without preceding definition, or axioms be admitted which were not clear, intelligible, and without ambiguity.[619]

Certainly the alphabetic symbols can only correspond with the elements of spoken language once these elements are considered to be "naturally fixed and unalterable (as much as the elements of figure or of geometry)."[620] And so the influence of Hutton's geometric reasoning was also evident in his *Principles of Orthography*.

Presuming that the elements of speech are definable, unalterable and fixed in man's constitution was the pivotal axiom upon which Hutton's *Principles of Orthography* was built. He thought that it is "only in this clear distinction of elementary sounds, that language can be rendered perfect, in the unequivocal pronunciation of speech; and it is only in this perfect execution of speech, that an

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[616] PK II, 659.
[617] PK II, 731.
[618] PK II, 657.
[619] PK II, 706.
[620] PK II, 660.

expression may be wrote, by the art of man, without difficulty or error."[621] Hutton's partial aim in *Principles of Orthography* was "to perfect or improve the practice of our orthography, in seeing the true principles which is founded that most scientific art."[622] But *Principles of Orthography* was first and foremost aimed at protecting the accuracy of science by counteracting the multiplication of error in language. And since "one false principle, admitted by us in our science, vitiates all that branch of reasoning which is founded on it"[623], Hutton had to firstly employ his approach of 'remounting to principles' in order to "distinguish the first principles of speech."[624] In doing so he arrived at the vowels which he noted were formed by an "operation which is instinctive; and thus we may be certain, that, in our analysis, we have arrived at a first principle."[625] Having "found the alphabetical principles of language" in human physiology, Hutton then thought that it was "in our power to perfect an alphabet upon that principle"[626], and this "task [of constructing a perfect alphabet] was undertaken" and dependant upon the "presumption of these elements being definable."[627] Indeed, allowing for his presumption that the first principles of speech were without tone, he accomplished what he set out to do and illustrated the advantages that his method would achieve. Therefore, from his *Principles of Orthography* it is evident that as with the rest of his entire body of work, James Hutton's dictum was that, "It is the nature of science to improve itself, by remounting to its principles."[628]

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[621] PK II, 665.
[622] PK II, 625.
[623] PK II, 721.
[624] PK II, 661.
[625] PK II, 669.
[626] PK II, 714.
[627] PK II, 706.
[628] PK II, 718.

Part III—Science

Chapter Five—The Importance of Hutton's Theory of Language to Science

While Hutton's theory of language was intended to facilitate education and to stabilize pronunciation it was primarily part of his metaphysics that was applied as an epistemology to his science. It was clearly evident that Hutton's metaphysics was applied to his science especially in his method of remounting to first principles, but as there is a mutual progress between science and language with error in one equalling error in both then it was also the case that Hutton's theory of language was part of the metaphysics which he applied to his science. And Hutton thought that if the English language continued to be based upon etymology, thus memory instead of principle, then it was in danger of ending up obstructing science like the Chinese language. Consequently, Hutton's theory of language had implications for his and others' science since if natural philosophy continued to be written on an erroneous etymological standard it would eventually fall into scientific ruin.

Clearly Hutton thought that the physical world could not be investigated unless the metaphysical world was founded on sound principles and this was emphasized throughout his work and was in fact evident in his physical as well as his metaphysical inquiries. Certainly, even within his *Theory of the Earth* it is evident that an understanding of Man was of primary importance as he wrote that,

> The globe of this earth is evidently made for man. He alone, of all the beings which have life upon this body, enjoys the whole and every part; he alone is capable of knowing the nature of this world, which he thus possesses in virtue of his proper right; and he alone can make the knowledge of this system a source of pleasure and the means of happiness.
>
> MAN alone, of all the animated beings which enjoy the benefits of this earth, employs the knowledge which he there receives, in leading him to judge of the intention of things, as well as of the means by which they are brought about; and he alone is thus made to enjoy, in contemplation as well as sensual pleasure, all the good that may be observed in the

> constitution of this world; he, therefore, should be made the first subject of enquiry.[629]

This part was presented to the Royal Society of Edinburgh in 1785 and later published in the first volume of the *Transactions of the Royal Society of Edinburgh* in 1788. But in 1795 in Volume I of his extended *Theory of the Earth, with Proofs and Illustrations* Hutton also noted that, "It is not given to man to know what things truly are in themselves, but only what those things are in his thought."[630] While both of these passages echo the sentiments of Hume, they are also clear evidence that within his science and in this case his geology Hutton was applying metaphysical inquiry to science. Therefore, this should always be taken into consideration whenever Hutton's geology is read.

Throughout Hutton's science there is evidence of how the examination of the principles of knowledge was the key to establishing scientific truth. Indeed, in his *Dissertations on Different Subjects in Natural Philosophy* (1792) Hutton noted that without solid metaphysical principles an examination of the physical world was worthless as,

> In order to avoid that error, so reprehensible in our present science, I have endeavoured (sic) to pursue, what I believe must be esteemed, the true method of physical investigation; viz. to analise (sic) our ideas of external things, by separating, with all the accuracy of metaphysical reflection, matter of fact from matter of opinion,—that which has the testimony of sense, from that which is only imagined by the mind itself, without having the sanction of external information; and especially, by distinguishing that which is only supposed from a *negative* appearance, and that which is necessarily concluded from the testimony of an information that is *positive*.[631]

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[629] Hutton, James. "Theory of the Earth; or an investigation of the laws observable in the composition, dissolution, and restoration of land upon the globe" in *Transactions of the Royal Society of Edinburgh*. Volume 1, 1788. 209-304 plus plates. 216-217.
[630] Hutton, *Theory of the Earth*, Volume I (1795), 187.
[631] Hutton, *Natural Philosophy*, xii.

Of course the way to establish positive information was by employing Hutton's geometric procedure and this was also evident in his science as he wrote that "physical principles, which at present are so few and so ill understood, may be established with all the evidence which is acknowledged in those of mathematics."[632] But Hutton's method of remounting to principles and his conclusion that the universe was designed and ordered were also evident throughout his science.

Hutton's general system was held together with the conclusion established in his metaphysics that there was divine design and order in the universe and this was displayed throughout his science. In the 1788 version of his *Theory of the Earth* he wrote that,

> Man is not satisfied, like the brute, in seeing things which are; he seeks to know how things have been, and what they are to be. It is with pleasure that he observes order and regularity in the works of nature, instead of being disgusted with disorder and confusion; and he is made happy from the appearance of wisdom and benevolence in the design, instead of being left to suspect in the Author of nature, any of that imperfection which he finds in himself.[633]

The first volume of the 1795 version of *Theory of the Earth* noted that "having surveyed the order of this living world, and having investigated the progress of this active scene of life, death and circulation, we find ample data on which to found a train of the most conclusive reasoning with regard to a general design."[634] In the second volume he wrote more explicitly that "We live in a world where order every where prevails."[635] Furthermore, in Volume II of *Theory of the Earth* Hutton thought that it was evident that nature was ordered by a benevolent power to prevent chaos in the world as,

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[632] Ibid., xiii.
[633] Hutton, "Theory of the Earth" (1788), 286-287.
[634] Hutton, *Theory of the Earth*, Volume I (1795), 281.
[635] Ibid., Volume II (1795), 545-546.

> that wise system of nature, in which nothing is done in vain, and in which every thing tends to accomplish the end with the greatest of economy and benevolence. Had it been otherwise, and the demolishing powers of the land increased, in a growing rate with the diminution of the height, the changes of this earth and renovation of our continent, in which occasionally animal life must suffer, would necessarily require to be often repeated; and, in that case, chaos and confusion would seem to be introduced into that system which at present appears to be established with such order and economy that man suspects not any change; it requires the views of scientific men to perceive that things are not at present such as they were created; it requires all the observation of a natural philosopher to know that in this earth there has been change, although it is not every natural philosopher that observes the benevolence accompanying this constitution of things which must subsist in change.[636]

But the benevolent power preventing geological chaos had also designed and ordered the moral system and made happiness the final cause of humankind. And in another of his works on science, *A Dissertation upon the Philosophy of Light, Heat and Fire* (1794), this aim was expressed by Hutton since,

> Science, no doubt, promotes the arts of life; and it is natural for human wisdom to improve these arts. But, what are all the arts of life, or all the enjoyments of the mere animal nature, compared with the art of human happiness—an art which is only to be obtained by education and which is only brought to perfection by philosophy! Man must learn to know himself; he must see his station among created things; he must become a moral agent; and he must enquire after that system in which he had been intended either for happiness, or for misery, as an end.[637]

So examples of how Hutton applied his metaphysics to his science can be seen throughout his scientific work and none more so than his methodology of remounting to principles.

The correction of first principles and the process of remounting to principles was another metaphysical aspect that was applied to Hutton's science. In his *Dissertations on Different Subjects in Natural Philosophy* (1792) he commented on

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[636] Ibid., 203-204n.

[637] Hutton, James. *A Dissertation upon the Philosophy of Light, Heat and Fire*. Edinburgh: Printed for Messrs Cadell, Junior, and Davies, London, 1794. v-vi.

metaphysics in response to those philosophers who had not paid enough attention to first principles as he noted that,

> reasoning from false principles is perhaps far more dangerous to science, than is false reasoning from principles which are true. Because, the faculty of reasoning justly upon our principles, is found in every person of a sound mind; whereas there are but few minds that posses the faculty of correcting unsound principles, by remounting through the various steps of reasoning to detect the first error of a rash assumption.[638]

And in the case of remounting through knowledge to find erroneous reasoning, in *Theory of the Earth* Hutton thought that "having once departed one step from the path of just investigation, our physical science is necessarily bewildered in the labyrinth of error. Let us then, in re-examining our data, point out where lies that first devious step which had been taken."[639] But of course Hutton considered that the way to examine "our knowledge of nature or of external things" was by

> remounting to the first progress of this growing series, or where the rudiments of science may be traced in the operations of a conscious mind. It is in order to have principles established in something, where, if possible, there may not be a doubt; and from whence, by proceeding with that strict attention which is due to science, we may in reasoning arrive at what might then be properly termed the truth of knowledge, in having no inconsistency, either in its principles or its result, that is, in neither proceeding from inconsistent principles, nor leading to opposite conclusions.[640]

Certainly, Hutton thought that he had corrected first principles in establishing his theory of perception and held that he had achieved both physical and metaphysical truth. However, the emphasis that Hutton placed upon remounting to principles also meant that natural philosophers could only attain certainty in their reasoning once they had remounted to first principles or the undoubted information received by sensation and perception as "the progress of our mind, in natural philosophy,

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[638] Hutton, *Natural Philosophy*, ix.
[639] Hutton, *Theory of the Earth*,, Volume I (1795), 292.
[640] PK I, 47-48.

originates all from that knowledge which we have by means of the information of our senses."[641] Indeed, since "all our knowledge properly arises from sensation (which from its nature is a thing certain)"[642], then

> every theory, respecting external things, that does not ultimately resolve itself into sensation, or originate from it, must be false or merely imaginary, as having no foundation in actual things, and as being only conceived in the mind forming abstract ideas, without the immediate conduct of absolute knowledge, which is the same with what is termed sensation.[643]

Yet in view of the fact that Hutton understood that the external world can only be inferred, his *Theory of the Earth* corresponded to his metaphysics in that he believed that all physical principles were "founded upon matter of fact or experience."[644] But also in his *Theory of the Earth* Hutton considered that indeed "few among philosophysing (sic) men remount to the first principles of their theory."[645] So no matter how many steps a natural philosopher took in a complex proposition Hutton thought that it was vital that all the steps should be retraced back to metaphysical first principles.

Hutton clearly thought that metaphysical principles should be applied to science and since his metaphysics included his principles of language these should equally be applied to science. Indeed, this was so as Hutton considered the application of language to be of critical importance "especially when the science of logic [which equaled language for Hutton] is considered as so essential to man; and when it is acknowledged, that metaphysics is the science in which the principles of

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[641] PK I, 44.
[642] PK II, 322.
[643] PK II, 93.
[644] Hutton, *Theory of the Earth*, Volume I (1795), 94.
[645] Ibid., 294.

all the others are to be examined."[646] Therefore, the crucial factor in understanding Hutton's work on language is that it was not merely a contribution to language improvement in fact it was part of Hutton's metaphysics which he applied to the other findings of his science. So Hutton's theory of language was essentially part of an epistemology in which he thought that the search for scientific truth was liable to corruption without accurate principles of language.

Language was placed early in the faculty of science in the progress of Hutton's ordered intellectual system. And since he considered "how little progress in the intellectual acquirements of mankind could be made without the aid of language" [647] then it was necessary to perfect language on proper principles just as it had been essential to perfect metaphysical first principles. But while it "cannot be doubted, that science and language mutually promote each other's progress"[648] in the individual, it is likewise in the human species. In the individual this mutual progress was illustrated by Hutton in the progress of the mind and how language begins once 'science' (i.e. beyond the instinctive faculties) has been achieved. However, this mutual progress in the species requires proper principles in both thinking and language so that accuracy is maintained in the accumulation of 'science' (i.e. as a large body of knowledge). Indeed, Hutton thought that,

> There is not an operation more scientifical (sic) than that of language; for, science is properly the operation of the species man, and not of the individual who also does his part: Now, language is the very means by which the species preserve science, in communicating it successively to the individuals.[649]

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[646] PK I, 575.
[647] Ibid.
[648] PK II, 154.
[649] PK III, 83.

So since Hutton thought that the progress of language and science were "conjoined"[650] then error in one could result in error in both thus dire consequences for natural philosophy.

Hutton believed that the consequences of erroneous language would be absurdity and confusion and this would also apply to his natural philosophy. An absurd practice of language would eventually lead to absurd science in which memorization would replace principles. Of course the most serious corruption of the English language was how the orthographical practice of an erroneous etymological standard meant that

> we do not find the same sound always connected with the same figure. Here is, therefore, in a scientific view of written language, a manifest absurdity, which has slipped into the practice of a nation learned and wise,—a nation that pretends to write and read on scientific principle.[651]

And Hutton thought that by continuing to adhere to this "erroneous system of written language…we only multiply error."[652] Therefore, in order to preserve natural philosophy accurately, language must be founded and practiced upon proper principles of language otherwise the accumulation of science written on a erroneous system would lead to the multiplication of erroneous science. Furthermore, the failure to adhere to alphabetical principles was more importantly symptomatic of the failure of philosophers to remount to first principles. Indeed, Hutton wrote that,

> It is the nature of science to improve itself, by remounting to its principles. The science of England has arrived at its present state by means of an orthography, which however is imperfect; and now it is the business of science, or philosophy, to perfect those very means by which knowledge had been attained.[653]

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[650] PK I, 579.
[651] PK II, 657.
[652] PK II, 730.
[653] PK II, 718.

So in opposition to the etymologists, Hutton thought that it was imperative to adhere to the first principles of language and the "natural order of reading and writing" in which the orthography follows the speech.[654] And he concluded that since these principles were self-evident then to ignore them was preposterous. Therefore, Hutton's conclusion was that the English langauge was slipping away from the alphabetical system and degenerating towards a language in which memorization would replace principles and resemble Chinese.

In support of his argument that the English orthography should strictly adhere to alphabetical principles, Hutton gave China as "a most illustrious example for the confirmation of our theory, and a powerful argument to induce us to perfect our orthography, by studying the scientific principles of that art."[655] While he recognised that the Chinese had invented printing, magnets, and gun-powder long before they were known in Europe and by doing so without the alphabet, Hutton thought that this was "an enigma, for the solving of which there is nothing, either in human history, or in the common sense of mankind."[656] Although in this regard the Chinese did not lack science, it was however the absence of the alphabet that prevented China from becoming as learned as the Europeans. Indeed, it was by means of the alphabet that the English had learned from other nations as Hutton noted that, "In England, again, there is as much science as in any other place upon the globe; and yet it must appear, that the English nation had not its alphabetical writing from its science, but its science from its alphabetical writing."[657] So the accumulation of science communicated across nations was made by using alphabetical writing in contrast to

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[654] PK II, 659.
[655] PK II, 629.
[656] Ibid.
[657] PK II, 718.

the Chinese nation in which learning to read and write became a lifetime's occupation. Certainly, Hutton thought that the Chinese

> method of reading and writing would require the study of a man's life to acquire, few people would be general readers or writers; and, nobody would be universally learned in this respect, as are our European scholars, however easy it would be for individuals to arrive at partial accomplishments in this respect, or for every body to attain to that which might be necessary for some limited transactions. Accordingly, in China, we find almost every person writing; but most of those that write, write very little; and no person, perhaps, in that great empire, can write above one half of the words of their language; at the same time, this difficulty must still increase with the progress of their science and their learning.[658]

Of course if the English language degenerated into a system that required a lifetime to learn it would have dire consequences for science. However, in contrast to the Chinese system Hutton believed that the alphabet was the "glory of science" and is a

> most ingenious invention, which does honour to human wisdom; being, next after speech, the most useful art of man; for, the alphabet, as it is the legitimate child of science, so is it the mother of learning. By an alphabet, children are taught to read, before they understand the written language; by an alphabet, men are taught to write every language that they hear, and speeches which they do not understand; and, by an alphabet, man is made a writer in a day, and a reader in an hour.[659]

Nevertheless, the alphabet had been corrupted and learning to read and write was obstructed by an erroneous etymological standard which Hutton believed could easily be overcome by returning to alphabetical principles. Consequently, Hutton was aghast that,

> if the invention of an alphabet does honour to human nature, and procures a most essential benefit to society, what must we think of the abuse of this valuable art, or the corruption of this useful science? What shall we say of learned nations, who seem to think that learning has become too easy, and therefore have contrived to make reading and writing more operose and less accurate, by giving to different characters the same expression of sound, and to different sounds the same character in writing, thus confounding science in ignorance, order in disorder?[660]

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[658] PK II, 641.
[659] PK II, 655.
[660] Ibid.

Although words spelt without connection to pronunciation happen in all European languages, Hutton of course was mostly concerned with the English language. And the danger of English degenerating to a system like Chinese was a reality for Hutton as he noted that,

> every deviation from the strict rule of scientifical (sic) distinction in the analysis of speech, and from the employment of alphabetical principles for the commutation of speech and writing, is so far to adopt the method, already considered, of writing by the figuring of words or syllables; a defect which, in the Chinese, we pity, with some degree of blame; and which, in ourselves, we are apt to excuse, perhaps not without some mixture of approbation.[661]

So Hutton was appalled with those who objected to orthographic improvement and wished to cling on to an erroneous etymological standard, especially since those objectors against improvement acknowledged the "error in our science" and were only able to object on the grounds that the correction of the language would be an "inconveniency."[662] Hutton was not however the first to give China as an example of how the English language could end up. Benjamin Franklin had proposed a phonetic alphabet in a letter to Mary Stevenson on July 20, 1768 because

> if Amendments are never attempted and things continue to grow worse and worse they must come to be in a wretched Condition at last; such indeed I think our Alphabet and Writing already in; but if we go as we have done a few Centuries longer, our words will gradually cease to express Sounds, they will only stand for things, as the written words do in the Chinese Language.[663]

But in contrast to Franklin's *Scheme for a New Alphabet*, Hutton's *Principles of Orthography* was far more extensive and complex, and it was also part of a metaphysical inquiry that was to be employed as a scientific method.

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[661] PK II, 716-717.
[662] PK II, 731.
[663] Franklin, Benjamin. From a letter to Mary [Polly] Stevenson from Richmond [England] July 20, 1768 in *The Papers of Benjamin Franklin: Volume 15—January 1 through December 31, 1768*. Ed. William B. Willcox. New Haven: Yale University Press, 1972. 175.

The multiplication of error in language also made an impact upon thinking and vice versa. So there was no point in correcting the principles upon which we think if our language continued to be erroneous. Indeed, in his *Principles of Orthography* Hutton noted that,

> one false principle, admitted by us in our science, vitiates all that branch of reasoning which is founded on it. Even the admitting of a principle which is not false, but the evidence of which is not seen, corrupts the mind, which is thus made to reason with the fallacy of man, and to believe without the certainty of science. Thus superstition is taught, instead of science; and men become learned without being wise.
> The subject may seem too trivial for the moral which is here endeavoured to be founded on it; perhaps it is so; nevertheless, if the reasoning be just, it is not altogether out of place. For, it must be considered, that when the question is this, How shall we best learn to think by rule, to know from principle, or to judge in science; nothing is so important to our learning, as the first rules which we are made to form. Now, when rules are multiplied without necessity, and exceptions to those rules considered of equal importance to the rules themselves, the way to science, if not perverted, is at least obstructed; for, it is not in learning rules of human institution that science is promoted, but in knowing the reason of such rules.[664]

Therefore, the multiplication of broken orthographic rules led to corrupt thinking as well as corrupt language. And if science and indeed metaphysics were to progress towards perfection then this required a proper method of recording so that our reasoning was correct. But although language was an art, the limited number of elements of speech was God-given benevolently and so having made signs for these sounds in the alphabet man should strictly adhere to principles. This was further justification according to Hutton for others to adhere to alphabetical principles rather than an etymological standard since why should orthography be based on an intentionally erroneous etymological standard especially as it goes against what is part of the order of the human constitution. Hutton hoped that both the Scots literati

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[664] PK II, 721-722.

at the Royal Society of Edinburgh and the English intelligentsia who read his *Principles of Knowledge* would see the wisdom in his proposals and take a lead by utilising his theory of language, however as with his physics and his metaphysics he did not expect that everyone would be able to see this as

> It requires philosophy to see the system of things, which in human nature leads to the principles of speech; and it requires the accuracy of science to define those principles, so as we may proceed synthetically to reason upon them, both for the improvement of our natural speech, and the perfection of our art of writing.[665]

However for those who had progressed in reason to philosophy which Hutton held was synonymous with natural religion it would be self-evident that language should be practiced upon God-given principles.

[665] PK II, 708.

Conclusion

While posterity has virtually ignored *Principles of Knowledge*, had it been rewritten as Playfair had done with the *Theory of the Earth* then it is possible that it might have received more attention over the years. However, Playfair noted "I have hardly found this work of Dr Hutton's quoted by any writer of eminence, except by Dr Par, in his Spital Sermon, a tract, no less remarkable for learning and acuteness, than for the liberality and candour of the sentiments which it contains."[666] And this neglect probably was more to do with the outmoded deism which featured throughout *Principles of Knowledge* rather than the obscurity of the text as in fact Playfair noted that when Hutton was writing about natural religion,

> It is worthy of remark, that while he is thus employed, his style assumes a better tone, and a much greater degree of perspicuity, than it usually possesses. Many instances might be pointed out, where the warmth of his benevolent and moral feelings bursts through the clouds that so often veil from us the clearest ideas of his understanding.[667]

Indeed, it was clearly his natural religion that Hutton held in greatest respect and although in posterity it has received little attention he would have been delighted with what *The English Review* made of this aspect of his *Principles of Knowledge* as,

> It has been the usual reproach of metaphysical writers, that their inquiries very generally terminate in scepticism; and perhaps the same constitution of mind which is fitted for the subtle and minute investigations of metaphysics, is not equally capable of those great and comprehensive views which afford the foundation of philosophical piety. From this reproach, however, Dr. Hutton's work is altogether free. There is, perhaps, no system of philosophy, ancient or modern, which presents so amiable and animating a picture of man, which exhibits so many sublime views of the system of nature, and which has the tendency to excite in the mind so profound a reliance on the wisdom and benevolence of its author. Whenever, too, these subjects occur, the Doctor expresses himself in a style of earnestness and animation which, while it shews the deep conviction of his own mind, is of all others the best fitted to produce an impression upon the mind of his readers. The value of such a work, in

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[666] Playfair, 'Biographical Account', 84n.
[667] Ibid., 83.

> the present state of science, it is difficult to appreciate; and we think we do no exaggerate its importance when we say, that in our opinion it is impossible for any one to rise from the study of it, without feeling himself a better and a happier man.[668]

Nevertheless, his metaphysical talent was unquestioned as *The English Review* also noted that,

> If we are to estimate the character of an author by the subjects on which his labours have been employed, Dr. Hutton will stand in the first class of philosophical writers. The inquiries he has pursued are the most important that can interest mankind, and comprehend almost every subject that has occupied the attention of philosophers, since the study of the human mind has been the object of their pursuit. In the conduct of these investigations too, he has every where given proofs of great vigour and originality of thought. His opinions, on all these subjects, are his own: instead of adopting the principles of any of the preceding sects of philosophy, he has formed his principles from his own reflection and observation: and even in the structure of his language he seems either to have forgot, or to have disdained, the usual phraseology of philosophy, and to have sought only for those terms that might best express his own peculiar conceptions. Whatever may be the final decision of philosophers with respect to the truth of his opinions, philosophy itself will always be indebted to him, not only for the light which he has thrown on many important subjects, but also for the example he has given of sincere and manly investigation.[669]

In spite of the neglect of *Principles of Knowledge*, this thesis has established that Hutton's metaphysics was a rigorously empirical epistemology that he applied to his science. He undertook an *a posteriori* Humean approach from which he thought that he had ascertained God's existence. His method was that observation must precede theory, and he saw himself as a philosopher rather than a geologist.

Devices that Hutton used to uphold his position included his argument that anyone could test his position *a posteriori* to reach happiness through wisdom and virtue, as well as utilising an original theory of perception to obtain a double physical and metaphysical proof. This double proof established that matter was an active

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[668] *The English Review*, Volume XXVI October 1795., 262-263.
[669] Ibid., 261-262.

power thus overturning the Newtonian paradigm that matter was inert, solid, extended and impenetrable. And so that his readers could test his theory of perception, Hutton provided an experiment as,

> the figures of letters of our alphabet are well known to us, and, upon the slightest look, they may be distinguished from each other; and, without a just consideration of the thing, it may be rashly concluded, that in such cases, when we have instantly named the letter which is presented, or a word composed of many letters, we have truly perceived its figure; this, however, is not the case, as is to be proved in the following manner: Instead of presenting those known figures, let a similar glance of the eye be taken of the letter of an alphabet that is written with a character perfectly different and unknown, then let the proper alphabet be immediately presented, in order that the observer may point out the letter that had been shewn (sic) sufficiently to have been distinguished and known, if it had been a letter of his own alphabet; in this case, his not being able to point out the letter, is a proof, that when he names the known letter upon a slight glance of the eye, the figure of the letter is not all perceived, but only a part, from whence the rest is imagined. This is also the case with a word of an unknown language written in our own alphabet.[670]

Within Hutton's theory of language a number of debates were entered into including one in his *Principles of Speech* against the belief in natural language by the *philosophes* Charles de Brosses and Antoine Court de Gébelin. Therefore, Hutton did not confine himself to matters solely directed towards members of the Scottish or English literati—he was also participating in arguments with the European intelligentsia. However, Hutton's theory of language was both an illustration of the mind's ordered progress as well as a critique against etymological rules which he thought could lead to scientific ruin. At a time when the origin of language debate was fully active, Hutton as to be expected took an empirical approach and so he did not engage in conjectural history nor did he comment on the social origins of language. He noticed that there were physiologically fixed limited sounds which he

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[670] PK I, 171

concluded were the result of God's benevolence so as to prevent linguistic chaos. But this was also an empirical examination as he described the vocal powers from experience.

Throughout *Principles of Knowledge*, Hutton noted that only the philosopher was able to notice systemised order and design in the universe bestowed by a benevolent power that had the happiness of humans as a final cause. In other words, the attainment of philosophy was equal to the attainment of natural religion. This was an *a posteriori* metaphysical exercise; therefore time and time again Hutton was referring to himself as a philosopher. While Playfair thought that Hutton "possessed, in an eminent degree, the talents, the acquirements, and the temper, which entitle a man to the name of a philosopher"[671], a thorough understanding of Hutton as an intellectual has been restricted due to him being pigeonholed as the 'Founder of Modern Geology.' Nevertheless, it would seem that Hutton thought of himself as a philosopher not merely as he had progressed to that level of intellect, but also because there is evidence that he wished to be portrayed as a philosopher. Indeed, a medallion created in 1792 by James Tassie in which Hutton wore "antique rather than contemporary costume", emphasized that he "thought of himself as a philosopher rather than as a farmer, geologist or businessman."[672] In contrast to the Tassie portraits of Joseph Black, Adam Smith, John Robison, William Robertson and Adam Ferguson; Hutton was shown in classical rather than eighteenth century dress.[673] And besides Hutton the only others to be portrayed in classical dress in Tassie medallions were "Robert Adam, the high priest of neoclassicism, and the

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[671] Playfair, 'Biographical Account', 88.
[672] Jones, Jean. 'James Hutton' in *A Hotbed of Genius: The Scottish Enlightenment, 1730-1790.* Edited by David Daiches, Peter Jones and Jean Jones. Edinburgh: The Saltire Society, 1996. 122.
[673] Jones, Jean. 'The Tassie Portrait of James Hutton' in *The Edinburgh Geologist.* Edinburgh: The Edinburgh Geological Society, No. 16. Autumn 1984. 2-5. 3.

philosophers David Hume[674] and Thomas Reid."[675] So it would seem that Hutton chose to be portrayed as a philosopher, not least because "the classical mode of the portrait is unlikely to have been suggested by Tassie, for he was apparently unaware of Hutton's reputation referring to him only as 'an Edinburgh gentleman'."[676] Therefore, Hutton's self-image was not that of a geologist, but instead he considered himself a philosopher.

Certainly, it was Hutton's methodology that held the greatest importance for interpreting how he approached his *Theory of the Earth*. Most of the historiography regarding Hutton has been directed towards whether or not his *Theory of the Earth* was based upon modern scientific methodology. From what this thesis has uncovered from his *Principles of Knowledge* it is evident that he applied a scientific methodology in keeping with modern standards.

Current interpretations of Hutton are unsatisfactory because he is incessantly categorised as simply a geologist in the same manner as Adam Smith has been pigeon-holed as merely an economist. Certainly, just as "one must rescue Adam Smith from the economists if one is to see him whole"[677], one must rescue Hutton from the geologists and historians of science if one is to see him whole. Contemporary interpretations of Hutton are also inadequate since the majority of them have been fixated with taking sides as to whether Hutton was a purely inductive

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[674] "Tassie made two medallions of both Hume and Adam. In each case the version in contemporary dress is by far the better known." Jones, Jean. 'The Tassie Portrait of James Hutton' in *The Edinburgh Geologist*. Edinburgh: The Edinburgh Geological Society, No. 16. Autumn 1984. 2-5. 5. n4.

[675] Jones, Jean. 'The Tassie Portrait', 3.

[676] Jones, Jean. 'The Tassie Portrait', 4., and 5 n.6. "Tassie to Wilson, Letter 56, 12th April 1792, Scottish National Portrait Gallery."

[677] Forbes, Duncan. 'Hume and the Scottish Enlightenment', in S.C. Brown (ed.), *Philosophers of the Enlightenment*, Chapter 5, Harvester Press for the Royal Institute of Philosophy (1979) 94-109 as collected in *Hume* (Great Political Thinkers: 10) Volume II (eds.) John Dunn and Ian Harris, Cheltenham, England: Edward Elgar Publishing Ltd., 1997. 78-93. 79.

or a purely deductive geologist. Of course, this thesis concludes that based upon his method in *Principles of Knowledge* and his intentions for natural philosophy Hutton used both induction and deduction however induction always took precedence over deduction. And another major confusion that most interpretations of Hutton have displayed is that they have failed to comprehend that his works were written at a time when natural religion and empirical science were compatible. Indeed, as Nicholas Hudson pointed out,

> The direction of ideological change has never been from one universally held position to another. Certain opinions may gradually achieve pre-eminence, pushing previously dominant positions into the periphery of what the intellectual establishment deems sound or orthodox. But intellectual history—particularly in areas devoted to human rather than physical sciences—is seldom characterised by the complete or sudden eradication of previous outlooks. Proponents of traditional and innovative ideologies may battle for ascendancy over many decades, and their encounters inevitably produce hybrid ideologies that seem neither entirely old or new. Individual authors will display both attachments to the past and leanings to the future. And their statements always form part of an ongoing dialogue with other authors past and present, or even with the author's own changing and indecisive ruminations.[678]

And in the case of Hutton's innovative *Theory of the Earth* he was using empirical principles combined with a teleology which was going out of fashion, but nevertheless one that he thought was ascertained by empirical principles. Therefore, the *Theory of the Earth* cannot be completely understood if it is read without examining Hutton's metaphysics because it is in the *Principles of Knowledge* that his epistemology is revealed. So the consequence of an investigation into the content of Hutton's metaphysics is that he can be observed not as either modern or old-fashioned, inductive or deductive, deist or atheist, but as an eighteenth-century Scots philosopher.

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[678] Hudson, Nicholas. *Writing and European thought, 1600-1830.* Cambridge: Cambridge University Press, 1994. 7.

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